AN INVESTIGATION OF QUALITY AND COMPLIANCE OF AGRICULTURAL FRESH PRODUCE SOLD IN THE TSHWANE METROPOLIS WITH THE AGRICULTURAL PRODUCTS STANDARDS ACT OF SOUTH AFRICA

By

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DECLARATION

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I declare that the above dissertation is my own work and that all the sources used or cited have been shown and acknowledged by means of complete references. I further declare that I have not submitted this work before, or part of it, for any degree or examination in any other higher education institution.

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ABSTRACT

The Agricultural Product Standards Act, 1990 (Act 119 of 1990) of South Africa provides for the standardisation of quality norms for agricultural produce (DAFF, 2018). The purpose of this research was to investigate the quality and compliance of fresh produce sold in the Tshwane metropolis with the Agricultural Product Standards Act of South Africa. A cross-sectional study survey was conducted in six regions of Tshwane metropolis, in which 200 fresh produce vendors were randomly selected from various vending sites to analyse their level of knowledge regarding the Act. Furthermore, different fruits and vegetables were sampled from different vending sites and inspected for compliance with the Act.The vast majority (89%) of respondents did not know of the existence of the Act. Quite a small proportion of fruit (51.5 %) and vegetable (56 %) retailers indicated that their agricultural fruit products have been monitored. A large proportion of fruits (from 86% to 99.8%) and vegetables (from 85.4% to 97.5%) met all the various quality requirements. In general a fair proportion of fruits (58%) and vegetables (65%) complied highly with the Act in terms of quality. There was a significant positive correlation between monitoring by officials and the level of compliance. The Department of Agriculture Forestry and Fisheries should make sure that farmers and street vendors of agricultural produce register their businesses and are trained on the interpretation of the provisions of the Agricultural Product Standards Act. This will allow them to be tracked and traced for proper development concerning matters related to the Act.

Keywords: Agricultural produce, Agricultural Product Standards Act, Safety, Quality, Compliance, Inspections, South Africa, Tshwane metropolis and Vendors.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	**:** Analysis of Variance
APS Act	**:** Agricultural Product Standards Act
CAC	**:** CodexAlimentarius Commission
CCP	**:** Critical Control Points
CoT	**:** City of Tshwane
DAFF	**:** Department of Agriculture Forestry and Fisheries
EC	**:** European Commission
FAO	**:** Food and Agriculture Organisation of the United Nations
FP	: Fresh Produce
FPM	**:** Fresh Produce Market
GAP	**:** Good Agricultural Practices
GDP	**:** Gross Domestic Product
GMP	: Good Manufacturing Practices
HACCP	**:** Hazard Analysis Critical Control Point
ISO	**:** International Organisation for Standardisation
MRL	: Maximum Residue levels
NDOH	**:** National Department of Health
NRCS	**:** National Regulator for Compulsory Specifications
PRP	**:** Prerequisite Programs
QM	**:** Quality Management
RSA	**:** Republic of South Africa
SABS	: South African Bureau of Standards

SPS : Sanitary and Phytosanitary

SPSS **:** Statistical Package for the Social Sciences

SSOP : Sanitation Standard Operating Procedure

TBT : Technical Barriers to Trade

TFPM : Tshwane Fresh Produce Market

USA **:** United States of America

WHO **:** World Health Organisation

WTO **:** World Trade Organisation

CHAPTER 1: BACKGROUND

1.1. INTRODUCTION

The Agricultural Product Standard Act, 1990 (Act 119 of 1990) of South Africa provides for the standardisation of quality norms for agricultural and related products. These norms include quality attributes, packaging, marking, and labelling (Department of Agriculture Forestry and Fisheries [DAFF], 2018). Fresh produce creates a vital role in the diet of human beings (Sivakumar and Fallik, 2013). Since fresh produce is acknowledged as a vital constituent of nutrition and a well-managed diet globally, the consumers request diversity of it and its accessibility throughout the year (Denis *et al*. 2016). In the fresh produce business, quality is the main factor that influences the price (Nawi and Batt, 2015). According to Sikora and Strada (as cited in Velčovská, 2018) quality of fresh produce can be explained as the collection of attributes that can influence the dietary and organoleptic significance of the produce as well as the safety of consumers. The quality attributes of fruits and vegetables comprise of external features such as size, form, colour, brightness, weight as well as flavour, taste, texture, and nutritional properties (Harker, 2001, as cited in Nawi and Batt, 2015).

The quality of fresh produce presented to consumers is controlled by the degree of quality attained during harvesting. It usually cannot be enhanced after harvest management, but can rather be maintained (Hailu *et al*. 2013). Fruits and vegetables regularly interact with harvesting tools (reapers, scalpels, shears, and cutters) and bowls (holders, containers, “trailer” and vans) used for the collection of harvested crops, and apparatus (like stalls, moving belts, washers or chilling tubs), which might be contaminated with disease-causing microorganisms from the soil stuck to them (Piližota, 2014). Since fresh produce spoils quickly, the properties associated with the internal quality characteristics of the produce

are vulnerable to several practices and the defects in quality may be due to diverse devices and conditions in the pipeline (Heising *et al.* 2014).

Fruits can be bruised or wounded due to falling or banging against each other or on surfaces (Behailu and Kebede, 2018). Proper handling at harvest can reduce damages of mechanic origin and decrease waste caused by a microbial occurrence (Wills *et al.* 1998, as cited in Hailu *et al*. 2013). After harvest decay and microbial contamination also affect the quality of fruits and vegetables hence, pesticides and insecticides are applied to effectively combat the issue, but they harm human health and the environment (James and Zikankuba, 2017).Vendors directly inter relate with consumers and become cognisant of their demands (Shokouhyar *et al*. 2018). Consumers have preferences for agricultural produce that areaffordable, attractive ("firm, decay-free, with few bruises and blemishes") (DAFF, 2018), safe to eat, and available throughout (Cristescu, 2015).

The fruits and vegetables retail sector perceives quality as important in distinguishing the attractiveness of one produce from another, thereby influencing the buyer's choice and consumer's likeness (Nawi and Batt, 2015). In addition, consumer's demand has increased for less addition of pesticide residues in fruits and vegetables (Sivakumar and Fallik, 2013). The main purpose of packaging is to keep the quality of fruits and vegetables and to inhibit infestation by pests and microbes that can cause spoilage and diseases throughout its food chain down to the consumer (Wani and Singh, 2014). According to Galic *et al.* 2016, cited in Anyasi *et al*. 2016), the quality of fruits and vegetables is decidedly reliant on the production environment, minimal bruises, and other injuries during fresh produce picking and handing out. Ideally, a perfect package has a water tight chemical reaction resistance which can permit the products (fresh produce) to maintain its real features (Anyasi *et al.* 2016).

The packaging is a very vital phase regarding infection of biological, chemical, or physical nature (Piližota, 2014). According to Mir and Beadry (as cited in Hailu *et al*. 2013) packaging separates the product (fresh produce) from the outside surroundings, and aids to guarantee an environment that if not sanitary, at the minimum decreases contact with pathogens and pollutants thereby extending the fruits and vegetables quality over a specific time.The packaging is also important in protecting agricultural produce against chemical and physical damage. On top of that, it serves as a marketing and information tool to consumers (Llyuk and Block, 2008, as cited in Wu, 2015).

In terms of the standard criteria, agricultural foods (fruits and vegetables) packages should contain relevant information, which is needed by consumers such as the name of the product, list of ingredients, quantity, expiry dates (packing dates), allergens declaration, and conditions of storage (Koen *et al.* 2016). Food labelling usually means placing information such as phrases, the symbol of alphabets, emblems, pictures, numbers, or signson food packages (Wyrwa and Barska, 2017). Labelling is used as a means of educating consumers to enable them to make cognizant decisions (Roche, 2016). Labels have been used previously for marketing food products (fresh produce) globally over the past one hundred years (Rimpeekool *et al.* 2015). Food labelling is one of the main means of interaction between the food firm and many consumers (FSANZ, 2008, as cited in Tonkin *et al.* 2015). It also plays a vital role in the trading of food (fresh produce) and is a basis of information for the consumer and other stakeholders of the production logistics (Wyrwa and Barska, 2017). The presence of labels on food products (fresh produce) provides consumers with an assurance that the product (fresh produce) can be traced back to its origin if there are problems (Grunert and Aachmann, 2016).

According to Woolfe and Primrose (as cited in Manning and Monaghan, 2019), fraudulent mislabelling on food product (fresh produce) tags is a prevalent problem, mainly in fresh produce that is high in value and demanding a higher price. Food fraud can impact the consumers negatively by depriving them of information that can help them decide on products and their quality. Furthermore, this places the risk for buyers who consume products that can harm their health (Zhang and Xue, 2016). Monitoring is used to validate that food (fresh produce), and the methods used to produce it comply with recognised standards to safeguard consumers from disease-causing agents and for controlling misleading practices of marketing (DeWaal *et al*. 2014). Quality assurance methods in inspections covering the safety of foods have to be applied and evaluated regularly to get the uppermost altitude of fairness in results from the inspection and offer a source for extra developments (Khalid, 2016).

The Government as regulators of food verifies if stakeholders are complying with food regulations (European Communities, 2002, 2004; FDA, 2011 as citen in Kettunen *et al*. 2015). Effective monitoring implies that there will be quality agricultural produce in retail outlets (Rouphael *et al.* 2018, as cited in Rouphael, 2018) hence, giving consumers the option of buying good quality agricultural produce which conforms to the legislative standards. The street vending of food (fresh produce) is a regular service which has been done by vendors for many years to earn a living (Taylor *et al*. 2000). Street vending is common in developing countries, with fresh produce being sold to semi-rural communities (Singh *et al.* 2016), due to lack of opportunities in the formal sector and a high rate of joblessness especially for individuals without a matric qualification (Chauke *et al.* 2015). Street vending makes a huge positive impact on the economy of countries that are developing (Alimi, 2016). In the African view, selling vegetables brings valuable means of income in the townships, which leads to the improvement of people's lives townships

(Peyton *et al.* 2015). The importance of street vending in townships is that it brings the business closer to the people in situations where it is difficult for people to reach the formal sector (Haydam, 2015).

1.2. THE RESEARCH PROBLEM

The problems this research seeks to address relate to the non-compliance of agriculture produce being sold at informal retail outlets in terms of quality, grading, packing, labeling and marking of fruits and vegetables by farmers and informal vendors as well as the lack of monitoring by competent authorities. Street vendors often sell poor quality agricultural produce in the informal retail vending market without proper packaging (Marumo and Mabuza, 2018). According to Kader (as cited in Porat *et al.* 2018), the quality of fruits and vegetables can be compromised because fresh produce is living plant entities and spoil easily with quite little life after harvest storing. Improper packaging of fresh produce can affect the quality of fresh produce resulting in the produce getting wounded, bruised, thus resulting in the change in colour which ultimately affects the shape of the produce and quality by spoiling the produce leading in poor pricing during trade (Woreda Agriculture and Rural Development Office-WARDO, 2014, as cited in Behailu and Kebede, 2018).

The formal sector where fruits and vegetables are sold is taken as businesses, which sell premium quality fruits and vegetables and follow regulations, they are always monitored by the authorities (Rajiv, 2010). Their growth and expansion is dependent on improving quality by ensuring that the product conforms to quality specifications (Njomo, 2012). Examples of formal sectors are supermarkets, chain provisions,and fresh produce markets, which specialises in fresh produce (Marumo and Mabuza, 2018). The informal sector,on the other hand, is found in provisional locations. It is not under any laws and there are no regulations governing their activities. It is also does not contribute to tax payment for their

services rendered (Roesel and Grace, 2015). Examples of the informal sector are street vendors and dealers who stock their fresh produce in larger quantities from the formal sector for resale to others (Potts 2008; Marumo and Mabuza 2018). The vendors in the informal sector most of the time stock their fresh produce from formal retail (Potts, 2008). Since the way the informal sector is structured and because their way of doing things is not regulated, they create a risk of selling fresh produce that can be of inferior quality or harm consumer's health in the market (Alimi, 2016).

Most fruits and vegetables sold in the informal market (taxi/bus/train stations and street corners) are inadequately graded (Marumo and Mabuza, 2018). Inadequate grading is when fruits and vegetables are not packed according to the same size, and not uniform in colour (Singh, 1994). The absence of grades and criteria in the market leads to the inefficient and vague flow of information in the market and insufficiency or absence of grades for quality subsidies to increased promotion prices (Digal, 2015).

The extrinsic factors of fresh produce have a high impact on the price of fresh produce (Bhargava and Bansal, 2018) because customer's decisiveness is based on quality perception (Palma *et al.* 2015). If the fresh produce is not graded correctly, for example, when the colour of the fruit is not the same in the box, then the consumers will pay less money for the produce at the market (Mditshwa *et al.* 2017). Similarly, most fruits and vegetables sold at informal retail outlets are poorly packaged. Poor packaging occurs when fresh produce is not packed in an appropriate package or not packed at all. The consequences of not packaging the produce appropriately are that the fruits and vegetables might be damaged or may deteriorate quickly, and this will affect their quality and shelf life (Porat *et al.* 2018). If produce is contaminated by hazardous substances or infested by disease-causing organisms it can harm the health of consumers (DeWaal *et al.* 2014).

The fourth problem is that of inadequate labelling. This occurs when the package of fruits and vegetables is not labelled at all and in turn, makes the fields of the labels to be incomplete, or not to describe the exact contents in the package. Deceitful false explanation on labels of food products (fruits and vegetables) is a common problem (Manning and Monaghan, 2019). Another reason for mislabelling is to deceive the consumer for economic gain (Spink *et al.* 2015). If the packaging of fresh produce is not properly labelled, they will mislead the stakeholders in the business and affect their purchasing choice, because it is used as a means of educating consumers to make a cognizant decision (Roche, 2016). For the farmers, the consequence of mislabelling agricultural produce is lower profit margins because the market representative required a good labelled product from farmers to sell their products (Nawi and Batt, 2015). The fifth problem is the lack of monitoring by competent authorities. This is often attributed tothe lack of manpower and resources to conduct inspections (Pswarayi *et al.* 2014). The consequences of partial implementation and enforcement of food legislationcan compromise the health of consumers, especially if the food has high levels of chemical residues, such as pesticides (Mutengwe *et al.* 2016a).

1.3. MOTIVATION FOR THE STUDY

The findings from this research will reveal information about the current state of compliance of agriculture produce with the Agriculture Product Standards Act as well as the level of monitoring in Tshwane metropolis. This research will highlight areas of lapses and recommendations from this study will assist the Department of Agriculture Forestry and Fisheries to develop strategies to improve compliance gaps.

1.4. THE AIM AND OBJECTIVES OF THE STUDY

This study aimed to investigate the compliance of agriculture produces sold by street vendors in the Tshwane metropolis, South Africa, as to whether they comply with quality requirements of the Agricultural Product Standards Act, 119(Act 119 of 1990) of South Africa. The secondary aim was to investigate the level of knowledge and awareness of fresh produce street vendors regarding the Agricultural Product Standards Act, 119 (Act 119 of 1990) of South Africa.

The objectives of this research are to:

1. investigate the knowledge and awareness of the Agriculture Product Standard Act, 119 (Act 119 of 1990) of South Africa of agriculture fresh produce street vendors in Tshwane metropolis;
2. investigate the compliance of agricultural fresh produce sold in the Tshwane metropolis to the requirements of the Agricultural Product Standards Act, 119 (Act 119 of 1990) of South Africa; and
3. investigate the effectiveness of monitoring by authorities to enforce compliance with the Agricultural Product Standards Act, 119 (Act 119 of 1990) of South Africa in the Tshwane Metropolis.

1.5. RESEARCH QUESTIONS

1. Are street vendors of fresh produce in Tshwane metropolis aware of the existence of the Agricultural Product Standard Act, 1990 (Act 119 of 1990), and its contents?
2. Whatis the level of knowledge of street vendors of Tshwane metropolis regarding the Agricultural Product Standard Act, 1990 (Act 119 of 1990)?
3. What is the level of compliance of agricultural fresh produce sold by the street vendors in Tshwane metropolis with the requirements of the Agricultural Product Standards Act, 119 (Act 119 of 1990) of SouthAfrica?

4. Is monitoring of fresh produce by authorities effective concerning the enforcement of compliance with the Agricultural Product Standards Act, 119(Act 119 of 1990) of South Africa?

1.6. CONCEPTUAL FRAMEWORK

Factors that can negatively affect the compliance of agricultural produce sold in South African markets are poor quality of the produce, ungraded produce; inappropriate packing, and mislabelling of agricultural produce. The Agricultural Product Standards Acts regulates the grading, packing and marking of agricultural products for the standardisation of norms for quality and the legislation is disseminated for awareness of the regulations by the public, for transparency in the market so that street vendors can make informed decisions when purchasing the agricultural produce (DAFF, 2018). The packaging is important in protecting the food against chemical and physical damage while maintaining its quality. Furthermore, labelling serves as an awareness and marketing tool forconsumers to ensure the delivery of relevant information regarding the product (fresh produce) (Llyuk and Block, 2008, as cited in Wu, 2015). For street vendors to make informed decisions, the understanding of the Act regulating the fruits and vegetables is critically important for compliance purposes.

Relevant authorities need to educate and inform agriculture produce street vendors about the existence and purpose of the Act and bylaws (quality, grading packaging, and marking) that they need to adhere to when doing their business on the street (Dal Molin Cortese *et al.* 2016; Singh *et al.* 2016). Monitoring entails taking samples of food (fresh produce) during harvesting, processing storage, and distribution and retail to ensure that fresh produce complies with the requirements and to contribute information for the valuation of risks and to detect offenders (DeWaal *et al.* 2014). The consequences of partial

implementation and enforcement of food legislation are that agricultural produce that does not comply with the regulation can pose health risk dangers if sold in South African markets. For example, agricultural produce is added with pesticides to improve the quality of the produce, and if added in high quantities the residues can pose danger to the health of consumers (Mutengwe *et al.* 2016a). If monitoring is not conducted, fruits and vegetables applied with unregistered pesticides will pose health hazards (Mutengwe *et al.* 2016b). Effective monitoring implies that there will be quality agricultural produce in retail outlets (Rouphael *et al.* 2018: Rouphael, 2018) hence, giving consumers the option of buying good quality agricultural produce thatconforms to legislative standards. The foregoing narrative of the conceptual framework of the study is depicted schematically in Figure 1.

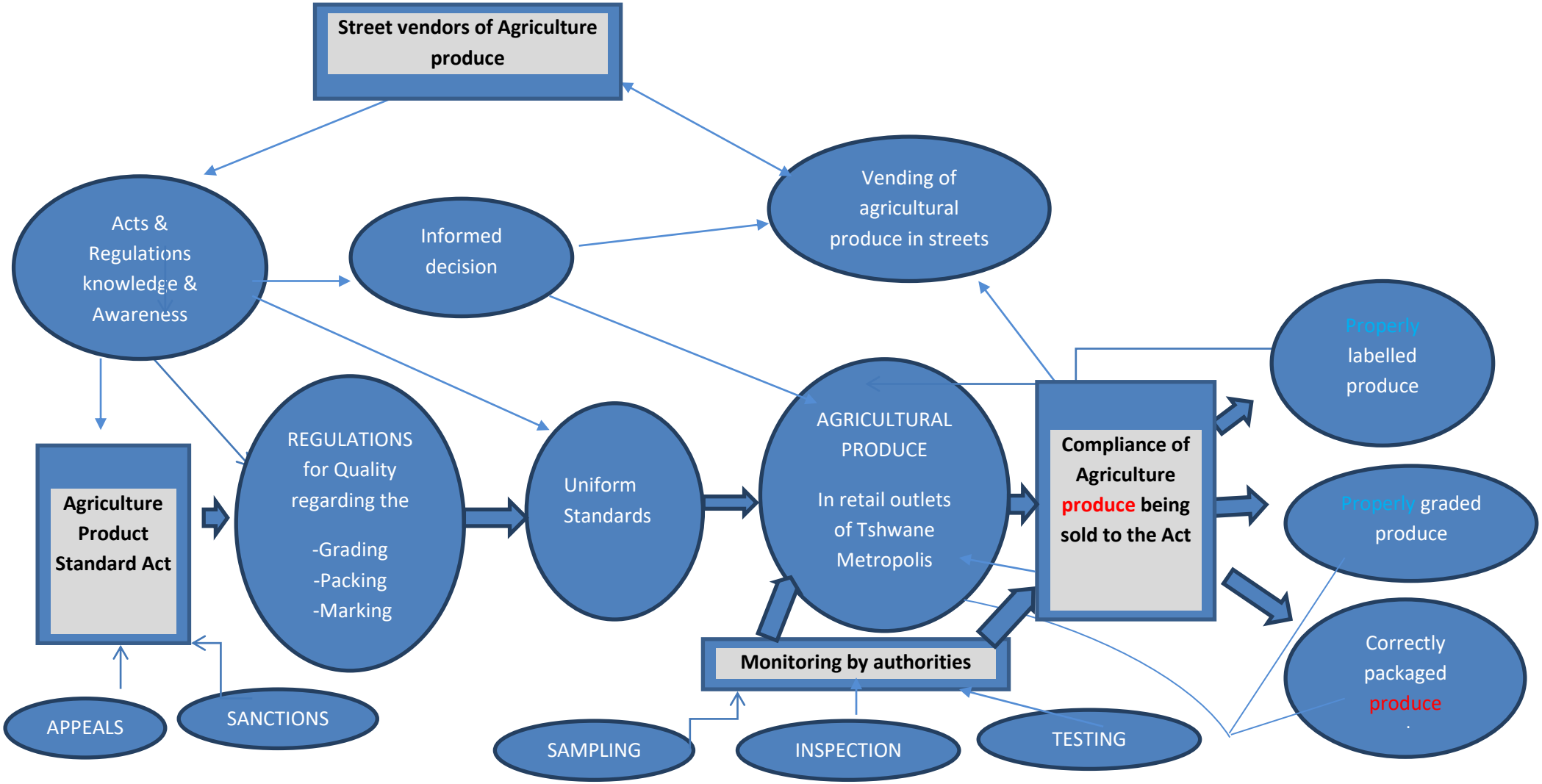

Figure 1: Conceptual Framework: Quality and Compliance of agricultural products sold in Tshwane metropolis with Agricultural Product Standards Act

1.7. LAYOUT OF THE DISSERTATION

This dissertation consists of six chapters that are arranged as follows:-

Chapter 1: Introduction: This chapter presents the study. It provides a synopsis of the study and provides background material. It also outlines the problem statement, the purpose of the study, the aim, and objectives of this study. Furthermore, it explains the framework of the dissertation.

Chapter 2: Literature Review: This chapter provides an overview review of current and existing literature on the food control system of fruits and vegetables. It reviews the quality and safety of fresh produce concerning the value and care attributes. Moreover, it outlines the review of different legislations that govern food produce, both nationally and internationally. It also analyses the enforcement of food safety and quality plus food law offenses and finally evaluates the literature of consumer's knowledge of food safety and quality of fresh fruits and vegetables.

Chapter 3: Methodology: This chapter summarises the research area, data collection, and the research tools that were used in the study.

Chapter 4: Results: This chapter summarises the research results emanating from the research survey results collated from the various participating streetvendors.

Chapter 5: Discussion: This chapter delivers a complete discussion of the results on the socio-demographic information of respondents, Agricultural Product Standards Act (APS Act) knowledge, and awareness of respondents. It also provides a further discussion on the results of the analysis of variance (ANOVA), and the results of the Spearman correlation analysis on the results of the quality of fruits and vegetables as prescribed by the Regulations relating to grading, packing and marking of agricultural produce intended for

sale in the Republic of South Africa as well as the level of monitoring of fruits and vegetables

Chapter 6: Conclusion and Recommendations: In this chapter, conclusions and recommendations for improvements are provided. A list of references and appendices then follows.

CHAPTER 2: LITERATURE REVIEW

2.1. FOOD QUALITY AND SAFETY

2.1.1 Food Quality

Food quality is differentiated from food safety because it is the degree to which all the recognised needs describing food features are achieved (Alli, 2004). Quality is a multifarious phrase that could be recognized in another way by the stakeholders in the food business (Rezai *et al.* 2014). “The International Organization for Standardization (ISO)” defines quality as “the degree to which a set of inherent characteristics meets the requirements.” Therefore the phrase “quality management” (QM) can be explained as “a process within an business, with the endeavour of achieving a constant perfection of a practice or a provision” (Albert *et al.* 2004).

The quality notion in the food business emphasizes the following three main aspects: -that product conforms to the proposed function; food safety; consumer satisfaction and views (Savov and Kouzmanov, 2009). The general example of food quality is the exterior o the fresh produce’s appearance which has a huge effect and the greatest impact on traders' buying decisiveness. According to Clydesdale (as cited in Nunes, 2015) features like how the produce looks, whether it is fresh and colourful are perceived as the primary criterion used when evaluating the instant quality of fresh produce. These are considered as the indicators of quality all through the food pipeline and are the deciding factors on whether the product is accepted or rejected in the market (Nunes, 2015). Quality features describe the product in a way that it can be beneficial to the consumers. However, it is experienced only after consumption. That is why consumers depend on their insight and experience of those characteristics for quality decisiveness before consuming the product (Vermeulen *et al*. 2015).

2.1.2 Food Safety

Food safety is the assertion that consumers will not be harmed by food from preparation to consumption, description unfolding to what is required by food safety must be achieved and intolerable risk which can harm humans must be avoided (Alli, 2004). The poisoning of food remains an alarming issue for human health (WHO, 2015). Most cases of food poisoning are a result of improper hygiene practices of food handlers (Trafialek *et al*. 2018). The foundation of the safe system of food implemented in the food business encompasses the amalgamation of "good manufacturing practices (GMP)", "sanitation standard operating procedures (SSOP)", and "hazard analysis and critical control point (HACCP) system"(de Oliveira *et al*. 2016).

2.1.3 Quality Assurance

Quality assurance encompasses the planning of all system actions employed in the structure of quality of an organisation that can be proved to demonstrate compliance and provide anassurance that the service or product will satisfy what is required for quality (Alli, 2004). It is the sole instrument of the market contest, with a decision on profit maximisation when broken into product features, product price, demand, and supply of the goods (Brink, 2010). Therefore, quality assurance is the guiding principle and official procedure of the "Quality Management Systems" in ensuring the wholeness of the system for quality, hence audits by the external body must be engaged to check the documentation of the quality assurance of the organisation (Farrell-Evans, 2014).

The significant structure of quality assurance of food systems are as follows:-

- Commitment and participation of all stakeholders in an organisation to uphold and sustain goods's quality and measures;
- Training of everyone employed in an organisation concerning their job descriptions and tasks;
- Avoiding the risks and continually improving and upgrading the main production phases and processes; and
- The arrangement of a traceable system of managing documents thatis amendable by the organisation (Savov and Kouzmanov, 2009).

2.1.4 Quality Control Systems

Quality control systems encompasses actions that include product inspection, product analysis, and product checking connected with supplies control, development of process control, and finished product control. The major purpose of food organisation quality control systems is to establish if the safety and quality specifications are met, by identifying potential hazards that might cause harm to food. The food may be fixed or modified to eliminate the detected hazard or be completely discarded (Alli, 2004).

2.1.5 Quality Assurance Systems

In the food business, quality assurance control systems are broader in extent than quality control systems. They also include inspection, analysis, and checking performances of quality control systems, together with more actions that are dedicated to preventing flaws of quality hazards associated with the safety of food. The actions are included and consistent in structuring the system. The intention of "quality assurance systems" is to offer assurance to an organisational administration, its clientele, and government bureau

regulators that the organisation iscompetent to satisfy the stated food and quality requirements (Alli, 2004).

2.1.6 Quality Standards and Specifications

Additional to laws governing food and regulations, food standards also set up specifications for quality and safety of foods; on the other hand, on condition that those food standards are included (Alli, 2004). Standards for food are required for all participants in the food pipe line. They retain the "nutritional values" and basic quality of huge food supplies for the nation. If there were no standards, there will be the same name for different food and this was going to lead to the deception of consumers and yielding a competition that is not fair (Smith *et al.* 2015). To sustain the quality of its products and the market reflection, the market or business must develop proper specifications for all products must. A lot of organisations will require specifications defined by the quality standard of that particular product and its manufacturing processes, such as harvesting, handling, and distribution. Organisations with no standards will hardly succeed in the market (Savov & Kouzmanov and 2009).

The identification standard describes the contents of the product, what a given food product is, its name, and the constituent which is to be utilised will appear on the package. Quality standards are only set up specifications for requirementsof quality (Smith *et al.* 2015). A range of standards and regulations are administered by the World Agricultural and Food Trade which is separated into two segments. The first group is created by regulations of countries for imported goods, which according to the "World Trade Organization (WTO) policy", the regulations are subjected to the "Agreements on Sanitary and Phytosanitary barriers (SPS)" and "Technical Barriers to Trade (TBT)". The second group comprises of the standards developed by the market and it is a requirement for various markets, and they don't fall under SPS and TBT Agreements and they include

Global GAP and British Retail Consortium Food Technical Standards which are voluntary on agreement basis (Herzfeld *et al.* 2011). The fundamental role that private food safety standards portray is the administration of food safety. A lot of food products in commercial markets are required to comply with these stringent standards (Fagotto, 2015).

2.1.7 Food Safety and Quality Assurance System

Principles of the safety of food and customs have been incorporated constantly into actions recognised around the assurance of quality or quality control systems in the food business sectoras a result, these measures and arrangements can tackle food quality and food safety at the same time (Alli, 2004). Quality standards and food safety does not only advance the safety of food, they also provide a means for correspondence and awareness of the buyers' practice (Zhou *et al.* 2011). There are three vital general systems of quality assurance food divisions and these are "Good Agricultural Practices (GAPs), Hazard Analysis of Critical Control Points (HACCPs), and International Organisation for Standardisation (ISO) "(Trienekens and Zuurbier, 2008).

The first one is **GAP system** comprises of several rules for agricultural practice guaranteeing the least set standards for producing agricultural products and storage.(Zhou *et al.* 2011). Significant subjects covered are management of pests (best possible utilisation of pesticides), handling of manure and water preservation of water quality, orchards and employee hygiene, the procedure for after-harvest management, and distribution. (Zhou *et al.* 2011).

The second one is **HACCP** which is a food safety management system based on identifying possible hazards in food, so that main actions, recognized as "Critical Control Points (CCPs)" can be engaged to minimise or eradicate the risk of the hazards identified. (Zhou *et al.* 2011). The third one is **ISO Standard** - An international standard that stipulates quality or food safety management requirements (Zhou *et al*, 2011). ISO 9001 is

globally accepted as the commanding standard in its playing field. However, all its requirements are general and are planned to be appropriate to all businesses, despite the kind, dimension, and products they offer. Since it lacks specificity, an ISO 9001 documentation is usually not accepted as adequate confirmation of satisfactory practice in the food businesses (Overbosch and Blanchard, 2014).

The food safety control systems are as follows:-

Sanitation Standard Operating Procedures (SSOP) are documented actions created and put into practice in an establishment to stop immediate pollution or the addition of adulterants in a product. The establishment is mandated to retain these documented actions on the folder (de Oliveira *et al.* 2016). They must be retrievable to the regulators when requested. SSOP comprises a comprehensive picture of the particular conduct essential to retain apparatus and tools from disease-causing microbesand prevents foodstuffs from being contaminated by getting in totouch with these tools and kits (Cruz *et al.*2006). The organisation is responsible for putting the procedures into practice as together with retaining daily paperwork that certifies the implementation, checking, and any implemented corrections (de Oliveira *et al.*2016).

Hygiene is the practice of taking care of yourself and cleanliness of your surroundings, to stop sickness or the spreading of diseases. It also includes subjects handling unfamiliar objects and preventing them to be in contact with food, cleaning rules about handling chemicals, greasing oils, and insect killers. When combined, they are generallyincluded in by what is universally called to as “prerequisite programs” (PRPs)(Overbosch and Blanchard, 2014).

Prevention and risk reduction is the one rule that is generally understood to be the elite subject of a single system: HACCP (hazard analysis critical control points). The HACCP system was incepted by Pillsbury in the ninenteen sixties and the arrangement was provided given a go ahead by Codex in ninenteen ninety three.This was because "Codex Alimentarius" string of standards is intended to provide the foundation for nationwide regulations and global trade, hence HACCP was adopted worldwide. (Overbosch and Blanchard, 2014).

"Process Variation Reduction" is a technique designed for dividing and classifying thefoundation of procedure discrepancy in surplus of natural, fundamental variation (frequently called regularsource variation), with the goal of their elimination.

5S is the common name use in the industry it originates from Japan.

The technique is regarding:-

1) Getting rid of the whole lot that is not required in the place of work;
2) Providing everything that is left in anobvious and stable place;
3) Maintenance of the place of work;
4) Controlling all familiar essentials of the place of work; and
5) Balancing and advancing the practice constantly.

The practices of 5S usually go beyond food businesses' PRPs, although close by can provide important synergy when combined with theessentials of PRPs with the careful 5S approach.(Overbosch and Blanchard, 2014).

2.1.8 Role Players in Management of Quality and Safety

All segments of the food system share the overall responsibility for food quality and food safety. This includes the different industries of food, government authoritarian agencies, and consumers. The food industry is officially permitted and ethically accountable to provide consumers with the food that complies with set standards for safety and quality. Inside a food organisation the general accountability for the execution and successful employment of these systems and programs lies with senior management (Alli, 2004).

"Total Productive Maintenance" is a means where employees participate by being responsible for making sure that they maintain the apparatus which they use when working and correct and prevent deviations (Overbosch and Blanchard, 2014).

2.1.9 Quality of Fresh Produce

Quality of foods is a combination of those features that differentiate individual elements of a product and has a significant influence on the acceptability of that element to the consumer (Domnica, 2014). In the business of fruits and vegetables, quality is a vital factor that affects attractiveness. Quality of product has a direct impact on the buyer's choice when comparing with other products (Nawi and Batt, 2015). From the consumer's perspective, the quality of food is mostly rated based on the sensory knowledge of food products, plus its origin, ways of production, and history.The signs of quality are mainly in the package, costing, andpresentation of the product in the market (Grunert and Aachmann, 2016). For fruits and vegetables, the features of quality are shown by four features, which are pigment that is the external part of the product, and is visual. Secondly, by the flavour which is described by the smell of the product and observed by the nostrils. Thirdly, by the taste that is experienced when eating the product. Lastly, by the texture which is the hardness or softness of the product and observed by touching or chewing (Nawi and Batt, 2015). Sivakumar and Fallik (2013) describe perishable fruits and

vegetables as a vital role of diet to humans. The features being described by pretty flesh colours and scent together with their nutrient which are recognized by the consumer. The attributes of quality are the internal features that relate to nutrients information and external features of the product in which environmental features like production area as presented by the retailer in the market (Sopi, 2017).

Quality guarantees or certifies the product, and it assures safety that the consumer seeks when buying. Quality hints provide direction to consumers about their eagerness towards the product they wish to purchase (Grunert and Aachmann, 2016). By means of quality control awareness of the products, spreading from one area into another, the safety of the consumer is increased, therefore, and they will be protected from harm (Jacxsens *et al.* 2015). Food legislation enables maintenance and controls ethics to protect consumers from deceitful practices and harmful food products considering that contaminated food can cause health problems as well as death (Ferenčić and Wolfling, 2015). In addition to the regulation of safety, food legislation also regulates the grading of agricultural fresh produce that is sold to consumers (Fisher, 2015). The implementation of quality standards can also lead to the improvement of the safety of agricultural fresh produce (Winfree, 2016). Ultimately, consumers are the ones who benefit the most from food safety and quality regulation because, with known values of quality and grades, they can have a choice of which product to buy, they are assured of quality, and safety of products that have been regulated (Fisher, 2015).

Governments globally have endorsed laws for food and rules intended to guarantee that foods is fit for consumption human. Those regulations protect unsafe and dishonest food from reaching consumers, plus to set up different agencies to enforce regulations regarding food. The legal structure is created to assure consumers about the quality and safety of foods (Alli, 2004).

2.2. FOOD LEGISLATION WITH FOCUS ON FOOD QUALITY AND SAFETY

Governments play an important role in the agricultural sector byensuring the safety and quality of agricultural fresh produce. They also safeguard that fruits and vegetables are protected from contaminants such as microorganisms, toxins, and harmful chemicals (Jacxsens *et al.* 2015). This is due to a study that was conducted in Canada where outbreaks of foodborne diseases were connected to fresh produce (Denis *et al*. 2016). The quality of agricultural produce is highly dependent on the freshness or shelf life of the product because they deteriorate in quality very quickly (Nawi and Batt, 2015). Examples of food deterioration include infiltration by insects, which lowers the quality of food, and browning of food due to enzymes in the product (Jacxsens *et al.* 2015).

Another factor is deterioration by pathogens that could be accumulated in the fresh produce during the food pipeline (Sivakumar and Fallik, 2013). Moreover, it standardises legislation with other countries regarding food legislation to make sure that the health of consumers is safe guarded and that the market in which food is sold is transparent for everyone to access (Carreño and Gladshtein, 2015). Food legislation is a collection of rules and regulations that gives guidance and protocols for controlling food in the nation during all stages of production i.e. from farm to fork and to protect the consumers from deceptive food practices and harmful or hazardous food (Al-Busaidi and Jukes, 2015). It is also there to protect and make consumers aware of food status in the market (Smolnikar and Slemenjak, 2015). According to Vidgen (2013), it is the responsibility of the Government to legislate the safety and quality of food products (fruits and vegetables) and to determine what must be in foods and the data, which is necessary to appear on labels. It is important to regulate the safety and quality of agricultural food products so that they comply with

local and international trade regulations and satisfy the demands of consumers (Cristescu, 2015).

2.3. INTERNATIONAL FOOD ORGANISATIONS AGENCIES

2.3.1 Codex Alimentarius Commission (CAC)

The Codex Alimentarius Commission is an organization that was created 55 years ago, and it is accountable for laying out the laws food safety for human protection all over the world (FAO/WHO, 2017). The Codex Alimentarius Commission is located in Rome, with its headquarters in Italy, and it is a body that sets standards with the World Trade Organization (WTO). Its rules are benchmarked worldwide for food (Poli, 2004). The standard together with their protocols are international set to provide fair trade to food, to ensure that food consumed issafe and in agreement with the set requirements (Veggel and and Borgen, 2005).

Codex Alimentarius Commission membership is available to all interested parties which are members of FAO and WHO interested in global food rules. Currently, CAC has 188 members of itsown comprising 187 states members, and one member of the association from the European Union and 240 Codex Observers (FAO/WHO, 2010). Its jurisdiction is not only to all registered members but any member state and any subordinate member of FAO or WHO can ask to participate in the organization and be granted an “Observer” membership because they are attracted to duties of the organization and they can be granted with membership if satisfied with their work of the CAC (FAO/WHO, 2010). Up to now, the food standards that Codex established are more than 200 for the produce of higher than 40 for technical establishments and hygiene (Veggeland and Borgen, 2005).

2.3.2 The Food and Agriculture Organisation (FAO)

The Food and Agriculture Organisation (FAO) is an organization that was established in 1945, in Canada City of Quebec as a specific organization of the United Nations. It is currently located in Italy and its headquarters is in Rome (FAO/WHO, 2016). FAO is present in over 130 countries is responsible for promoting the global trade in food with standards acceptance intended for guaranteeing reasonable official support to countries that needs assistants about projects for poverty and trade performances of consumer health protection (Poli, 2004). It is also responsible for addressing malnutrition in view of improving their remote upbringing (FAO/WHO, 2016). It has 197 members that consist of 54 African countries, 28 Asian countries with three of them observing, 53 European countries with three of them observing, 33 from joined the Caribbean, and Latin America. In the Northeast, it has 288 members that consist of five observers, two members from North America, and 30 from South West Pacific. Its jurisdiction has spread out to five continents opening five regional offices at Ghana in Accra and Hungary at Budapest, in China at Bangkok in the Caribbean and Latin America in Santiago and Egypt at Cairo. It also has one hundred sub-regions and domestic offices (FAO/WHO, 2016).

2.3.3 Food Standards Agency

The Food Standard Agency is an organization that was formed in April 2001. It is responsible for recognizing and making food laws for safety and sanity in view of the protection of humans in the United Kingdom. It administers food safety rules and supervises work in meat factories to monitor compliance with regulations in the United Kingdom (Food Standards Act, 1999). Its headquarters is situated in London. Its members are England, Wales, Scotland, and Northern Ireland which is led by the board which acts

in the public interest, and its jurisdiction is spread over its four regional offices in England, Wales, “Scotland, and Northern Ireland” (Food Standards Agency, 2016).

2.4. SOUTH AFRICAN FOOD LEGISLATION

The South African food legislation is administered by three national departments namely;- the National Department of Health (NDOH) Directorate Food control; Department of Agriculture, Forestry and Fisheries under the branch:- Agricultural Production, Health and Food Safety and Department of Trade and Industry under the agency National Regulatory Compulsory Specifications (NRCS) which arose from the South African Bureau of Standards to protect the safety and health of consumers (Department of Health, 2016). The food law in South Africa under the National Department of Health is enforced through municipalities by the environmental health practitioners under the Foodstuff Cosmetic and Disinfectant Act, 54 (Act No.54 of 1972).

In the Department of Agriculture, Forestry and Fisheries under the branch: - Agricultural Production, Health, and Food Safety are the enforcers ofthe Directorate Inspections Services and Assignees under Agricultural Product Standard Act, 1990 (Act 119 of 1990). Liquor Products Act, 1989 (Act No 60 of 1989) and Directorate Veterinary Public Health under the Act Meat Safety Act, 2000 (Act No 40 of 2000) falls under it. At the Department of Trade and Industry (DTI), food is enforced under the agency of the National Regulatory Compulsory Specifications (NRCS) under the National Regulator for Compulsory Specifications Act, 2008. (Act No. 5 of 2008) and the Consumer Protection Act, 2008 (No 68 of 2008). The objective of the food control under Foodstuff Cosmetic and Disinfectant Act, 1072 (Act No. 54 of 1972) is to ensure that South African consumers are safe with regards to food produced in the Republic and that they are aware of the contents in the product and whereabouts of the product as this will aid in their decision

making so that they are not deceived by food suppliers (National Department of Health [NDOH], 2016).

Moreover,the Agricultural Product Standard Act, 1990 (Act No. 119 of 1990) is to control matters related to agricultural produce and to ensure that the consumers are aware of quality norms and standards of agricultural products in the market, which are uniform in terms of grading and quality to aid the consumer to make an informed decision when purchasing the products (DAFF, 2018). The National Regulator for Compulsory Specifications Act, 2008 (Act No. 5 of 2008) is used to make the public aware of the safety of food products that they consume and to protect their health, the environment from pollution and lastly to make sure that the trade is fair amongst all involved (Runge, 2015).

2.4.1 The Agricultural Product Standard Act, 1990 (Act 119 of 1990)

The Act addresses the development of standards for the quality of agricultural products. The standards are uniform and benchmarked with international standards for products concerned. The standards are made known to the people who are concerned about the production and sale of products. The created standards include features such as quality, marking, labelling, packaging, and information about the hazards that may be present in agricultural products.The objective of the Act is to give consumers products of stable quality (Agricultural Product Standard Act, 1990). Products, which are regulated under this Act, are fresh products from plant origin, and products of certain animals Products regulated are grouped into categories of the following products;- agronomy, deciduous, animal products, processed products, citrus and sub-tropical fruits local and vegetables local, canned products, processed products, and fruit juices (DAFF, 2018).

2.4.2 Foodstuff Cosmetic and Disinfectant Act, 54 (Act No.54 of 1972)

According to the Foodstuff Cosmetic and Disinfectant Act, 1972, the Act addresses food products, food powders, and decontaminators in terms of their production, purchasing, import,the export, and covers issues around them. It also develops policy and its distribution for the safety of food including labelling and other subjects relating to food. A protocol that directs all parties involvedin food safety issues isdeveloped under this law and broadcasted to the public for information thereby teaching them food control systems. The Act also manages food control projects and look into safety warnings. The products that are regulated under the act include preservatives and antioxidants,colorants, herbs and spices, acids and bases, emulsifiers, flavourings, and leavening agents (Foodstuff Cosmetic and Disinfectant Act, 1972).

2.4.3 Liquor Products Act, 1989 (Act No 60 of 1989)

The Act addresses the purchase and making of liquor products. It also regulates contents of the products and uses of other substances that may be present in the liquor product. Itcovers the appointments of certain bodies involved in overseeing the import and export of some liquor products and issues related to liquor. The Act regulates products such as bottled, bulk liquor, wines, brandy, whiskey, and liqueur (Liquor Products Act, 1989).

2.4.4 Meat Safety Act, 2000 (Act No 40 of 2000)

The Act addresses the safety of meat and meat products processes and gives the provision of the state lawsconcerning developing rules that govern abattoirs. It also covers the appointments of certain bodies involved in overseeing the import and export of some animal products and issues related to meat. The Act regulates products such as beef, lamb,

and pork that are slaughtered in approved facilities that comply with hygiene requirements (Meat Safety Act, 2000 Act No 40 of 2000).

2.4.5 National Regulator for Compulsory Specifications Act, 2008 (Act No. 5 of 2008)

The Act addresses issues of compulsory specifications of South Africa and makes sure that the panel of the national regulator remains selected. It also offers the management and keeping up of technical regulations about safety and health and protection of the ecology for the welfares of the community and provides for problems linked to them. Products regulated under the act are canned meat and fish products, as well as frozen seafood. The Act covers the checking of public places for compliance with technical regulations and alertness of the public about matters of technical regulation (National Regulator for Compulsory Specifications Act, (2008).

2.4.6 South African Standadization Body

The South African Bureau of Standards (SABS) is the Principal national standardisation body in South Africa. It is recognized by the Standards Act, 1945 (Act No.24 of 1945), under the Standards Act, 2008 (Act No. 8 of 2008). The SABS is a Schedule 3B public body under the “Public Finance Management Act”, 1999 (Act No. 1 of 1999).

The SABS offers services that affect the achievement of businesses, firms,and the market by reducing the risk failure of service and product whilst breaching the information irregularity regarding the least amountof product quality requirements by the market. The aim of the SABS is associated with the Department of Trade and Industry’s objectives. These goals of the SABS sums up its directive and jointly signify its function.

The role of the SABS is-

- Offering consistency and compliance appraisal services that smooth the progress of progress and instruction of public and local trade and industry activities
- Allowing broader participation and access to the standardisation national process and services.
- Standards development and to offer compliance evaluation services to protect the South African market integrity.
- Providing assessment conformity services on a marketable basis. (SABS, 2020).

2.5. ENFORCEMENT OF FOOD SAFETY AND QUALITY SYSTEMS

Enforcement necessitates going into areas where agricultural produce is produced and sold, and checking for compliance with existing regulations and making sure that food regulations are applied throughout the food pipeline (Kerns, 2016). Enforcement aims to ensure that consumer's health is protected and that food produced complies with International Standards and that consumers are protected from deceiving activities related to food production (DeWaal *et al.* 2014). Agricultural fresh produce regulation enforcers are competent inspectors that are authorized by the government to carry out those functions. The law enforcers are Health Inspectors, Plant Inspectors, Quality Inspectors, and Veterinary Inspectors, they enforce the law at ports of entries and locally in production areas, municipalities or any appropriate place (Regulation (EC) No. 882/2004, 2013).

2.5.1 Monitoring

Monitoring of agricultural fresh produce involves verifying that the food-producing organizations are managing risks associated with food safety and instituting residue levels, chemicals, and hazards that are safe for human life. It entails keeping the database of all activities around the agricultural industry for reference (Regulation (EC) No. 882/2004, 2013). The database includes a list of all production unit areas and food establishments that are registered with the government. Data of all surveillances around the agricultural environment and situation related to food injuries (Shukla *et al.* 2018). Other monitoring activities include checking programmes such as Hazard Analysis Critical Control Point (HACCP) to ensure that hazards are controlled and monitored and checking compliance with global procedures for export for compliance with export conditions of those countries (Al-Busaidi and Jukes, 2015).

2.5.2 Inspection

Inspection of agricultural fresh produce involves going to a production area, checking the records of sanitation, and spraying for pests, and surveillance of foreign species at production areas and pack houses.It also entails checking the grading and quality of the product (fresh produce) to ensure safety for human consumption (Regulation (EC) No. 882/2004, 2013). Inspection is used to validate that food, and the methods used to create it comply with the set requirements to look after consumer's health by controlling hazards that cause diseases and guard practices of misleading promotion (DeWaal *et al.* 2014).The inspections at ports of entry entail physical inspection of products, phytosanitary inspections, and paper reviews (Chen *et al.* 2015).

The inspection provides the nation with credence and certainty that the food establishments produced quality food, which is fit for human consumption (Al-Busaidi and Jukes, 2015). The duties of inspectors are to sample food for testing, check the quality and phytosanitary of the product and to certify the product for consumption and inspect food premises for hygiene (Shukla *et al.* 2018). Food inspection safeguards the consumers and assures them that food they eat has been checked out through the stages of food production under state laws (Al-Busaidi and Jukes, 2015).

According to the Food Safety Modernization Act, though inspections the food sector, food establishment will be held liable for their control of creating safe food. The legislation recognises that inspection is an important means of confirming the integrity of the product (Hystad, 2015). As stated earlier, in South Africa food inspections of agricultural produce is conducted by Assignees and Inspectors of Directorate Inspection Services of Department of Agriculture Forestry and Fisheries and under the Agricultural Product Standards Act, 1990 (DAFF, 2018) and under Foodstuff Cosmetic and Disinfectant Act, 1972 inspections areconducted by Environmental Health Practitioners at municipalities (NDOH, 2016).

2.5.3 Testing

Testing of agricultural fresh produce entails taking a sample of agricultural products and testing them for maximum residue level to obtain a value that indicates the level of toxicity of the agricultural inputs applied during production.The other purpose is to test pests and diseases if they are present in the product thus posing the risk of harming the health of consumers (Regulation (EC) No. 882/2004, 2013). According to FAO/WHO (2003); Al-Busaidi and Jukes, (2015) the food control system must have a laboratory as a requirement and must-have tools to operate. Laboratories are important in food analyses and they aid in

certifying and giving food confidence that they are fit for human consumption. The result from the laboratories often acts as exhibits in the court of law. As reported by the Chinese Law and Government, 2012, Article 34 the government must establish analysis and inspecting structure for agricultural produce for safety and quality. Moreover, the analysis of food samples should be carried out by endorsed laboratories with calibrated equipment to carry out the analysis (Shukla *et al.* 2018). In South Africa, food is tested at Government Laboratories within the Department of Agriculture Forestry and Fisheries (DoH *et al.* 2013).

2.6. FOOD LAW: OFFENSES AND PROSECUTIONS

2.6.1 Offences

Offences occur mainly when a fraudulent product is placed on the market to deceive consumers or imitation of the original products are introduced into the market and this could lead an official to a hearing or issuance of violation notice issuance (Kerns, 2016). In the Netherlands food establishments are issued a fine or penalty when they fail to comply, they are issued an official warning and infringement notice (Hoogenraad and Duivenvoorde, 2016). A study was conducted in the United States of America on "Partial adherence to voluntary quality standards for experience goods", to determine the level of compliance that is required for products to be lucrative in the market if they comply with industry standards. It assessed whether a reprimand can be a way forward for cautioning manufacturers who produce low-quality products, but concluded that is will be difficult to implement punishment for non-complying factories because they were not complying with the Standards (Winfree, 2016). In South Africa, the Agricultural Product Standard Act, 1990 (DAFF, 2018) and the Foodstuff Cosmetic and Disinfectant Act, 1972 make provision for offenders to be prosecuted.

2.6.2 Seizures

To ensure that law enforcement exists in the country, the government must make sure that the food not complying with regulation are removed from the shelves particularly those that have the potential to cause harm (Magli, 2016). This may happen without reimbursing the proprietors, to stop it from consumers reach (DeWaal *et al.* 2014). A further examination is recommended by the inspectors to make sure that products comply with regulations (Kettunen *et al.* 2015). According to the European Union General Food Law Regulation (178/2002) Article19, the accountability lies with the food establishment, if they produce unsafe food, it must remove or evoke food products that are not complying and make consumers aware of that situation, and if necessary join forces with the law enforcers for awareness (Hoogenraad and Duivenvoorde, 2016). In South Africa, the Agricultural Product Standard Act, 1990 (DAFF, 2018) and the Foodstuff Cosmetic and Disinfectant Act, 1972 make provision for non-complying products to be seized.

2.7. CONSUMERS'AWARENESS OF SAFETY AND QUALITY OF AGRICULTURAL FOOD

Given that consumers always desire safe and healthy food, it is important that the management, of the safety and quality of food, is in place to meet the demands of consumers (Cristescu, 2015). Consumers need to know that the grades and standards of agriculture food products regarding the safety and quality of food products are in place (Verçuni *et al.* 2016). Consumers do want to consume agricultural fresh produce with no residues or minimal level of pesticides (Sivakumar and Fallik, 2013). Due to changes in the lifestyles and awareness of many consumers of food quality and safety, agricultural fresh produce is being scrutinised by retailers due to consumer demands. Nowadays, consumers are more concerned about the conditions in which the food they buy was

produced in terms of the production environment, product health status, usage of agricultural inputs and veterinary medicines as well as whether or not products were manufactured with the use of genetically modified organisms (Daniloska, 2014).

Some consumers have concerns about imported agricultural fresh produce regarding contamination by disease agents, pollution by heavy metals, and other toxins and chemicals agents (Asiegbu *et al.* 2016). Factors relating to the safety and quality of agricultural fresh produce that may influence consumers' loyalty to a particular product include appearance, taste, smell as well as packaging and labelling (Ferenčić and Wolfling, 2015). Consumers will not settle for products of inferior quality as long as they know that they can get a better product somewhere else (Baetjer, 2015). They request the diversity of these products throughout the year (Denis *et al.* 2017).

Currently, consumers are knowledgeable about the safety and quality of agricultural fresh produced evelopment, their production, and manufacturing methods before they decide between buying them (Daniloska, 2014). Presently, consumers with knowledge are requesting premium quality for fresh produce and they are provided irregular information on produce shelf life in the stores and displays (Besik, 2017). Agricultural food producers and manufacturers must do away with products that are of poor quality (Vermeulen *et al.* 2015). Consumers need more information on a particular food product (Daniloska, 2014). South African consumers must make informed decisions about whether or not they want to purchase that product in the market or not (Vermeulen *et al.* 2015).

2.7.1 South African Consumers Awareness of Food Safety and Quality

A study was conducted on "A consumer perspective of the South African red meat classification system," of the Agricultural Product Standard Act, 1990, which revealed that the respondents who took part in it were not aware of the system used for classifying meat in South African markets. It then concluded that consumers should be educated about the contents of the Act, its meaning in terms of the features of the product and quality. It then suggested that improved information could help the consumers to be decisive when purchasing red meat (Vermeulen *et al.* 2015).

2.9. SOUTH AFRICAN INFORMAL FRESH PRODUCE RETAIL SECTOR

South Africa as a developing country has a low percentage of employment. The majority of South Africans who are working have primary education inherited from the apartheid system of schooling (Gamieldien, 2017). Therefore, the rate of joblessness is rising together with the informal market as people are looking at better ways to fend for themselves. People chose this segment because there are no entry obstacles and skills to be successful it it (Masonganye, 2010).

The informal market represents more than a quarter of the national trade market (Haydam *et al.* 2015). According to Vemeulen and Bienabe (2007) the informal sector consists of:- "spaza shops, street vendors, general dealers, cafes, tuck shops, townships, street corner stalls, established in the countryside, taxi ranks, and train stations". Due to the minimum prospect in the official segment of the economy of South Africa, most people resorted to hawking to make money to fend them. Even though there are regulations, which favour vending, there are not enough sites for business (Gamieldien, 2017).

Informal employment is a profit-making business assumed by one or more people. It is more common in countries that are developing.

Informal trade is structured as follows:-

- The vendors who struggle to make enough money to support their families or to maintain their businesses.
- The vendors who make enough money to support their families can operate on profit maximisation
- The vendors who operate on structures that arepermanent and operate by official business ethics. (Masonganye, 2010).

The informal market stock produce from the formal retailers (Haydam *et al.* 2015), at establishments such as fresh produce markets and wholesalers. Most of the informal sector consumers are from townships because the formal sector is unable to supply the townships with services and also the formal sector is difficult to access (Marumo and Mabuza, 2018) as transport is need to reach it.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. DESCRIPTION OF STUDY AREA AND STUDY POPULATION

The study was conducted in Tshwane metropolis in the six sections of the city (Pretoria East, Pretoria North, Pretoria Central, Pretoria North-West, Centurion, and Marabastad). The sections were selected because it is the hub of agricultural produce vendors and it consists of taxi ranks, bus stations, and train stations that are densely populated with consumers who demand the produce.

Figure 2: City of Tshwane Metropolis (Municipalities of South Africa, 2018).

3.2. RESEARCH DESIGN AND SAMPLING

The study used a cross-sectional (survey) research design to collect data from small scale and informal vendors of agricultural freshproduce. A random sampling technique was used to select vending sites. Tshwane Metropolis was divided into six sections, which were; Pretoria East; Pretoria North; Pretoria Central; Pretoria North-West, Centurion, and Marabastad. Vending sites were selected randomly from the existing vending sites within each section. From each vending site, only agricultural produce vendors were selected and 200 vendors participated in the study.

3.3. DATA COLLECTION INSTRUMENT

The research instrument used for data collection was a questionnaire and a checklist (Appendices 1-3). The questionnaire contained questions on socio-demographic details of respondents, the characteristics of the agricultural fresh produce vendors'sites, and knowledge of the existence and purpose of the Agricultural Product Standards Act of respondents. Furthermore, it had questions about the knowledge of the quality and grading of agricultural fresh produce by respondents, knowledge on marking and packaging requirement of agricultural fresh produce of respondents, and knowledge on compliance and penalty requirements.

The checklist consisted of questions relating to the quality of fruits and vegetables as prescribed by the Regulations relating to grading, packing,and marking of agricultural produce intended for sale in the Republic of South Africa.[Regulation;-(No.R.364 of 2013);(No.R.859 of 2013); (No.R.635of 2017); (No.R.1031 of 2010); (No.R.963 of 2012); (No.R.4588 of 2016); (No.R.750 of 2014); (No.R.192 of 2015);(No.R.963 of 2012); (No.R.899 of 2011); (No.R.901 of 2011); and (No.R.587 of 2016)].

3.4. SAMPLING OF VENDING SITES AND RESPONDENTS

The sampling of vending sites was selected in the following manner:-

Registered Vendors: These are vendors who are registered with the City of Tshwane Metropolis and sell fruits and vegetables at permanent constructed structures in the city's train /bus /taxi ranks. The respondents in the sections were selected randomly by interviewing the first vendor then skipping two vendors and then interviewing the fourth vendor due to the vendors being closer to each other.

Figure 3: Registered vendor in the City of Tshwane Metropolis streets (Picture by the researcher)

Unregistered Vendors: These are the vendorswhosell fruits and vegetables full time at street intersections. Respondents in the sections were selected randomly by interviewing four vendors from each intersection where agricultural products were sold. This entails for example sampling one person from the North, East, South, West of the street intersection in the sections of the City.

A total sample size of 200 respondents was selected from six different sections of the Tshwane metropolis and used since it is within the acceptable sample size of the rule of thumb for primary research (Figure5).

Figure 4: Unregistered vendor in the City of Tshwane streets (Picture by the researcher)

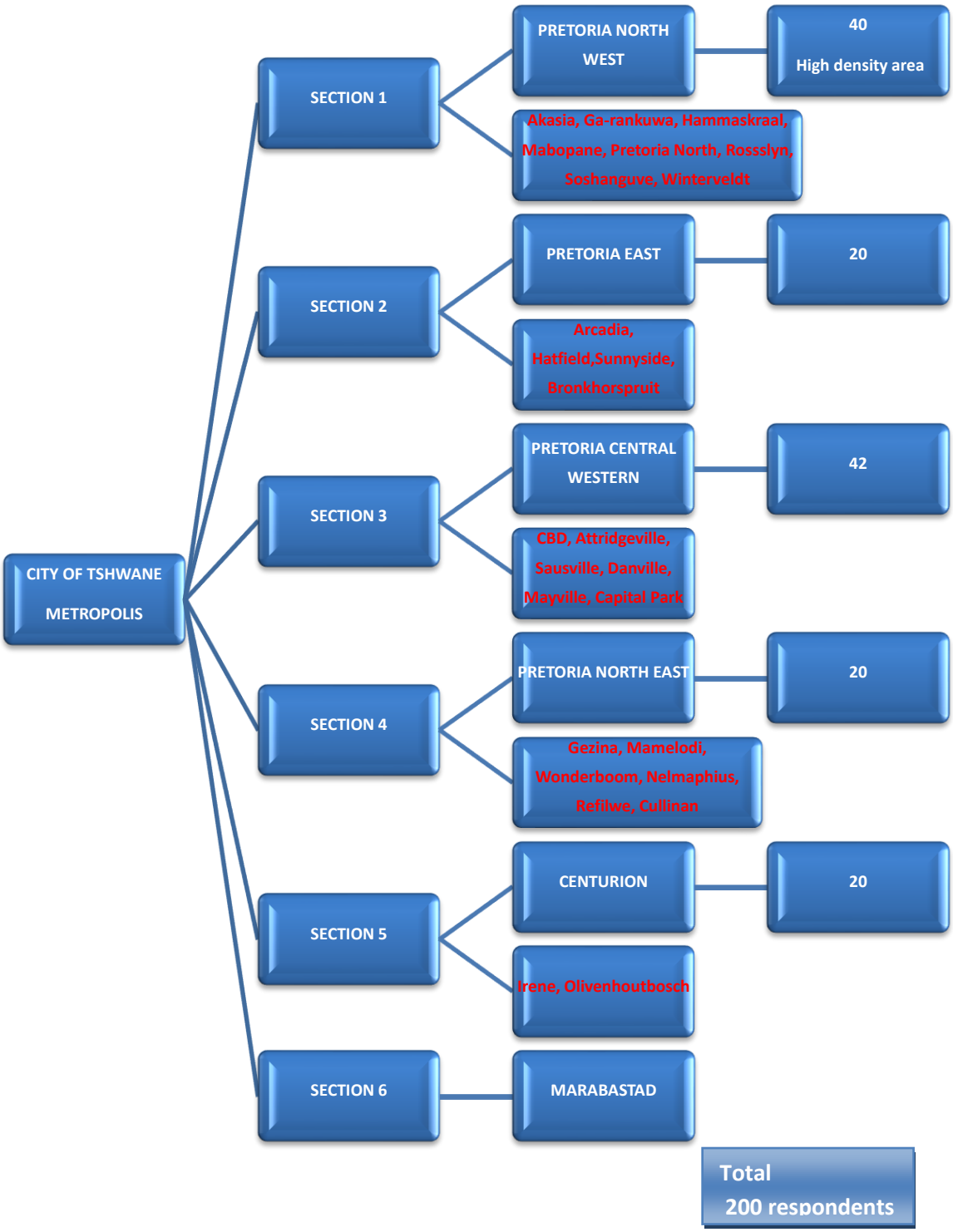

Figure 5: Sampling design sketch with reference to Figure 1: Knowledge and awareness

3.5. SAMPLING AND MONITORING OF FRUITS AND VEGETABLES

The sampling of fruits and vegetables was conducted in the following manner:-

Fruits: 50 fruits (per variety) were selected in the vending site's display and inspected for quality according to the criteria set out in the relevant regulation of that produce.

Vegetables: Up to 50 vegetables (per variety and size) were selected in the vending site's display and inspected for quality according to the criteria set out in the relevant regulation of that produce.

A total of 464 different common fruits and 398 common vegetables produces respectively were randomly selected from eight different fruits types namely:- Apples, Avocados, Bananas Citrus, Grapes, Peaches, Pears and Plums (from each fruit type, 50 fruits were sampled 6 to 8 times from vendors display in sections of Tshwane Metropolis) and seven different vegetables type namely:- Beetroot, Butternut, Cabbage, Carrots, Potatoes, Onions and Tomatoes, (from each vegetable type, up to 50 vegetables were sampled 6 or 7 times from vendors display in one section of Tshwane Metropolis) (Figure 6 &7).

Monitoring of fruits and vegetables

Monitoring of fruits and vegetables was done by checking the labels on the boxes against the purchase receipt of fresh produce sampled for inspections from fresh vending sites display. The receipt will indicate if the product was a downgrade for quality or was the same grade as displayed on the box.

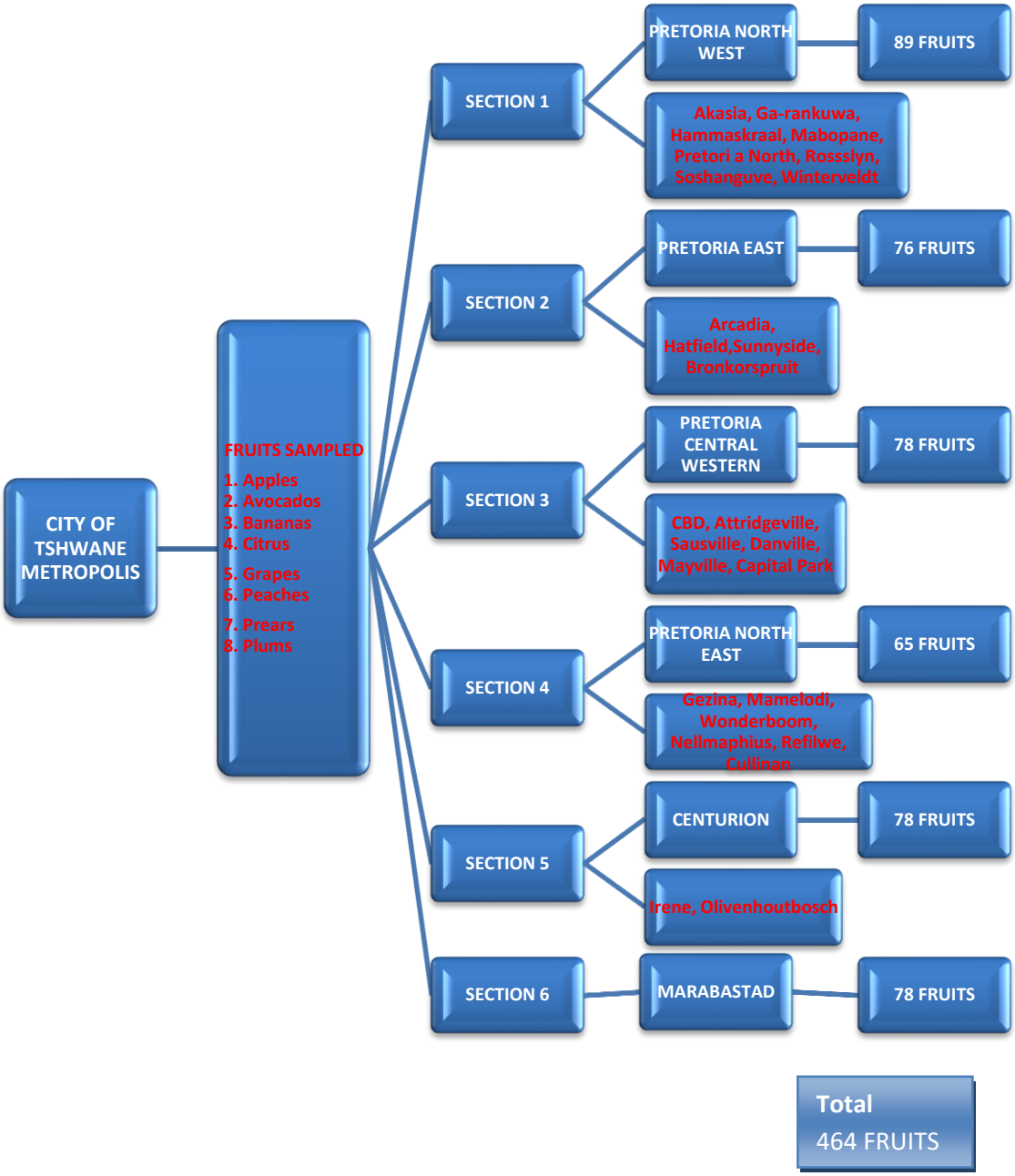

Figure 6: Sampling design sketch with reference to Figure 2: Inspection of fruits

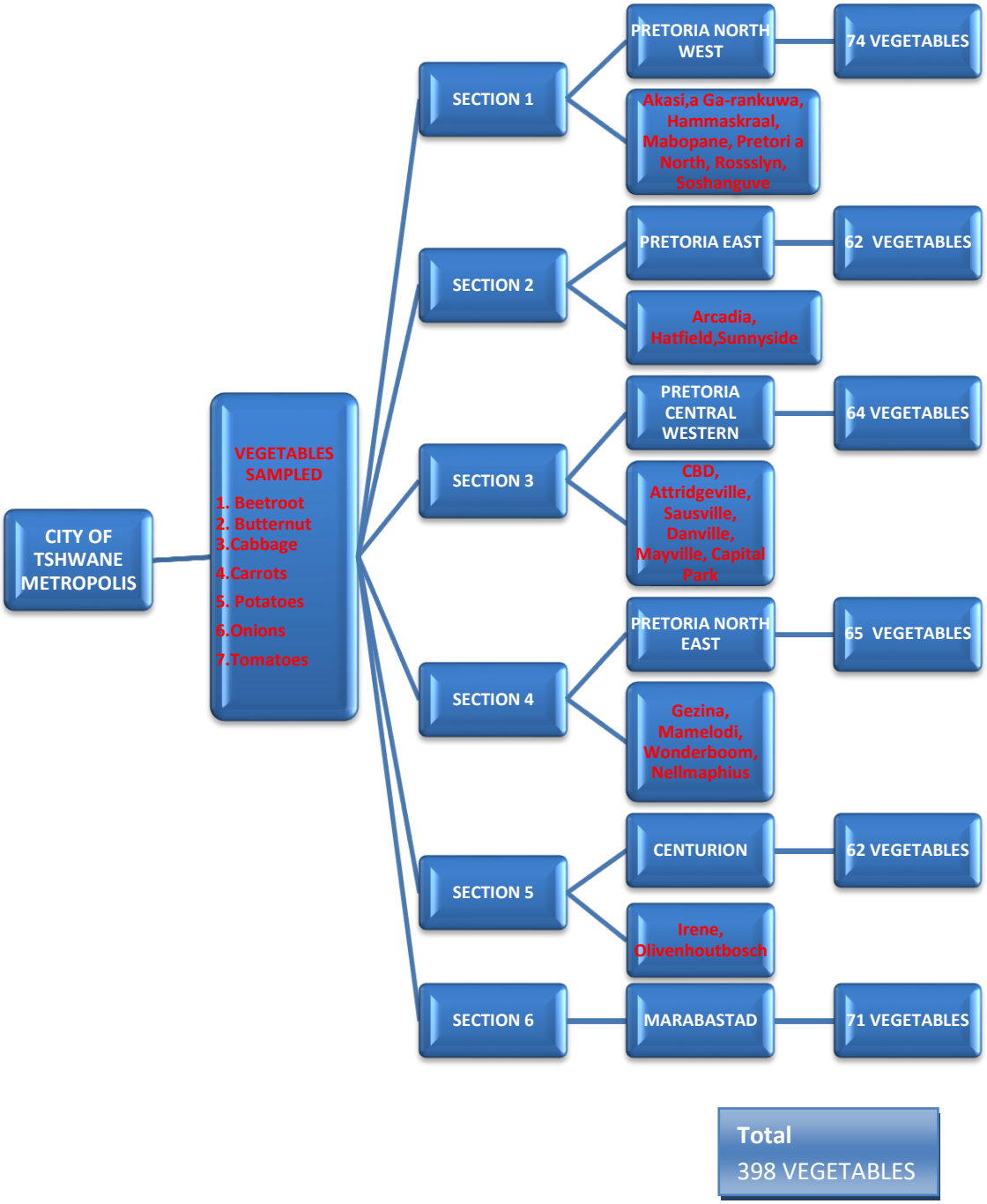

Figure 7: Sampling design sketch with reference to Figure 2: Inspection of vegetables

3.6. DATA COLLECTION

The data was collected over two years by the researcher. Data collection using the questionnaire was utilised employing face-to-face interviews. The questions were asked in the respondents' home language as the majority of them were illiterate (did not finish Matric) and took 15 minutes to provide the information that was collected by the researcher. Data collection using the observation sheet was conducted by the researcher. A total of 50 fruits /vegetables (per variety) from the vending site's display were sampled 6-7 times in regions and inspected for quality, according to the criteria as set out in the relevant Regulation of that particular produce.

The information collected was then recorded in the information checklists which were created according to sampled fruits and vegetables Standards by marking the checklist for compliance and non-compliance.The packaging material of the fruits and vegetables was also analysed according to the labelling criteria set out in the relevant Regulation of that particular produce. Monitoring of fruits and vegetables was done by checking the labels on the boxes against the purchase receipt of fresh produce sampled for inspections from fresh vending sites display. Each observation session lasted approximately 30 minutes and the information was collected by the researcher.

3.7. ESTABLISHMENT OF VALIDITY AND RELIABILITY

A questionnaire was piloted by the researcher before the survey to ensure validity and reliability. The pilot study consisted of 20 respondents selected randomly from Asiatic Bazaar (Marabastad). A panel of experts with experience in selling fruits and vegetables examined the questionnaires using previous experience and knowledge to ascertain instrument validity for the intended purpose. They assisted to ensure content validity and whetherthe instrument wasappropriate for measuring what it was supposed to measure.

The reliability and internal consistency of the questionnaire were determined during the pilot study using the Cronbach's alpha coefficient. The higher the score the more reliable and consistent is the instrument. Data collected from the pilot study was used in the final study to increase the sample number, as the information collected was reliable.

3.8. DATA ANALYSIS

The data collected were statistically analysed using SPSS software version 23. Descriptive. Statistics were used to summarise the variables. The Spearman correlation analysis was used to determine the relationship between selected variables. Statistical significance was identified at a 95% confidence level ($P \leq 0.05$). Analysis of Variance (ANOVA) was used to determine if more than two means of variables being compared were significantly different.

3.9. ETHICAL CONSIDERATIONS

Ethics approval for this study was obtained from the Department of Agriculture Forestry and Fisheries, City of Tshwane Metropolis, and the ethics committee of the College of Agriculture and Environmental Sciences, University of South Africa. Each participant in the survey was presented with a research questionnaire, which highlighted the nature and purpose of the study, the research process and role of the survey was expected to play in providing data. It also included a consent form. Written informed consent from each individual was obtained before participation in the research.

CHAPTER 4: RESULTS

4.1. KNOWLEDGE AND AWARENESS OF THE AGRICULTURAL PRODUCT STANDARDS ACT BY VENDORS

4.1.1Socio-demographic details of respondents

The majority of respondents were males (64.5%), while females (35.5%) were the minority. The majority of the respondents were single (55.5%) and the rest were either married (39.5%), divorced (0.5%), or widowed (4.5%). The majority of respondents did not have a matric qualification (72.5%) and only a few (27.5%) had a matric certificate or higher education certificate/diploma/degree qualifications. The vast majority of respondents were black (97.5%) and the majority (59%) of them were above 45 years (Table 1).

4.1.2 The characteristics of the agricultural food produce vending sites of respondents

The majority (83.5%) of respondents were selling agricultural food produce on registered street vending sites, which included taxi /bus/ train station vending sites and the rest of them (16.5%) sold their products on unregistered street vending sites. The majority of (78%) respondents worked between 6-7 days a week. The majority (73.5%) of the respondents had been selling agriculture food produce for a living for more than 5 years among which, and 44.5% have been doing so for more than 10 years.

Table 1: Biographic information of respondents (N=200)

Variables		**Frequency (%)**
1.1 Gender	Male	129(64.5)
	Female	71(35.5)
1.2 Marital status	Single	111(55.5)
	Married	79(39.5)
	Divorce	1(0.5)
	Widow(er)	9(4.5)
1.3 Academic level	Below a matric qualification	145(72.5)
	Matric certificate	50(25)
	Certificate/diploma/degree	5(2.5)
1.4 Race	African	195(97.5)
	Coloured	1(0.5)
	Indian/Asian	1(0.5)
	White	1(0.5)
	Others	2(1)
1.5What is your age?	18-25 years	23(11.5)
	26-35 years	59(29.5)
	36-45 years	58(29)
	46-55 years	38(19)
	56-65 years	17(8.5)
	68-75 years	5(2.5)

Table 2: The vending characteristics of respondents (N=200)

1.6 Agricultural food produce vending sites	Registered street vending sites	120 (60)
	Unregistered street vending sites	33(16.5)
	Registered Taxi rank /Bus rank/ Train station vending sites	47(23.5)
1.7 How often do you work in this agricultural food produce retailing outlet?	1-2 days a week	3(1.5)
	3-5 days a week	41(20.5)
	6 days week	97(48.5)
	7 days a week	59(29.5)
1.8 For how many years have you been selling agricultural food produce for a living?	Below 2 years	26(13)
	2-4 years	27(13.5)
	5-10 years	58(29)
	10-20 years	55(27.5)
	Above 20 years	34(17)
1.9 Where do you normally buy/get your agricultural fruits and vegetables?	Tshwane Fresh Produce Market	151(75.5)
	Marabastad Retail Market	49(24.5)
	Directly From Farmer	20(10)
	From Fruit & Vegetable Wholesalers	4(2)
	Directly From own Food Gardens	0(0)
1.10. Which of the following influences your choice on where to buy your fruit and vegetable produce stock?	Grade	137(68.5)
	Brand Name	24(12)
	Price	145(72.5)
	Target Market	10(5)
	Perishability	14(7)
	Others	6(3)

4.1.3 Places where fruits and vegetable retailers often buy agricultural produce stock and factors that influence their purchasing decisions

Most respondents bought their agricultural food produce stock at the Tshwane Fresh Produce Market (TFPM) (67%). (22%) bought their produce from Marabastad Retail Market and the rest bought their produce directly from farms (9%) and (2%) from fruits and vegetables wholesalers. The majority (43%) of respondents indicated that the price of the agricultural produce was the most important factor that influenced their choice to select where they bought their agricultural produce stock. This was followed by the grade (41%), brand name (7%), perishability (4%), and lastly, target market (Table 2 and Figures 8 & 9).

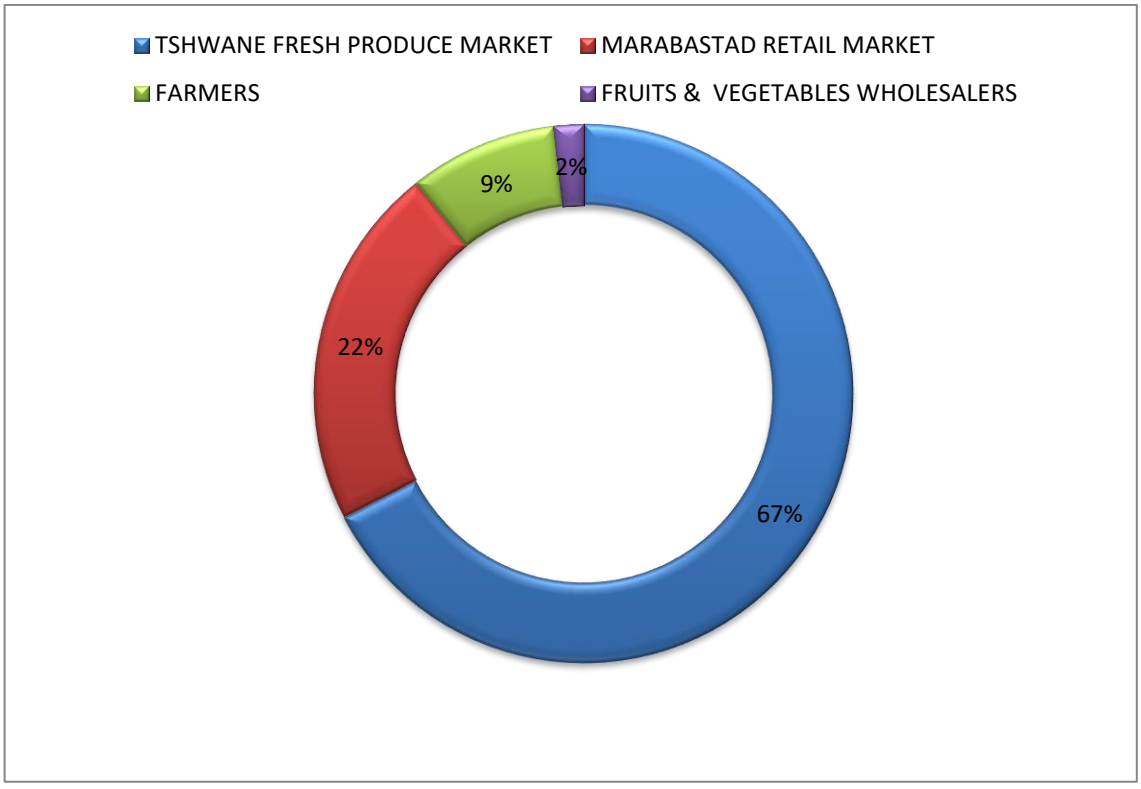

Figure 8: Places where street fruits and vegetables vendors often bought their agricultural fruit and vegetable stock (N=200)

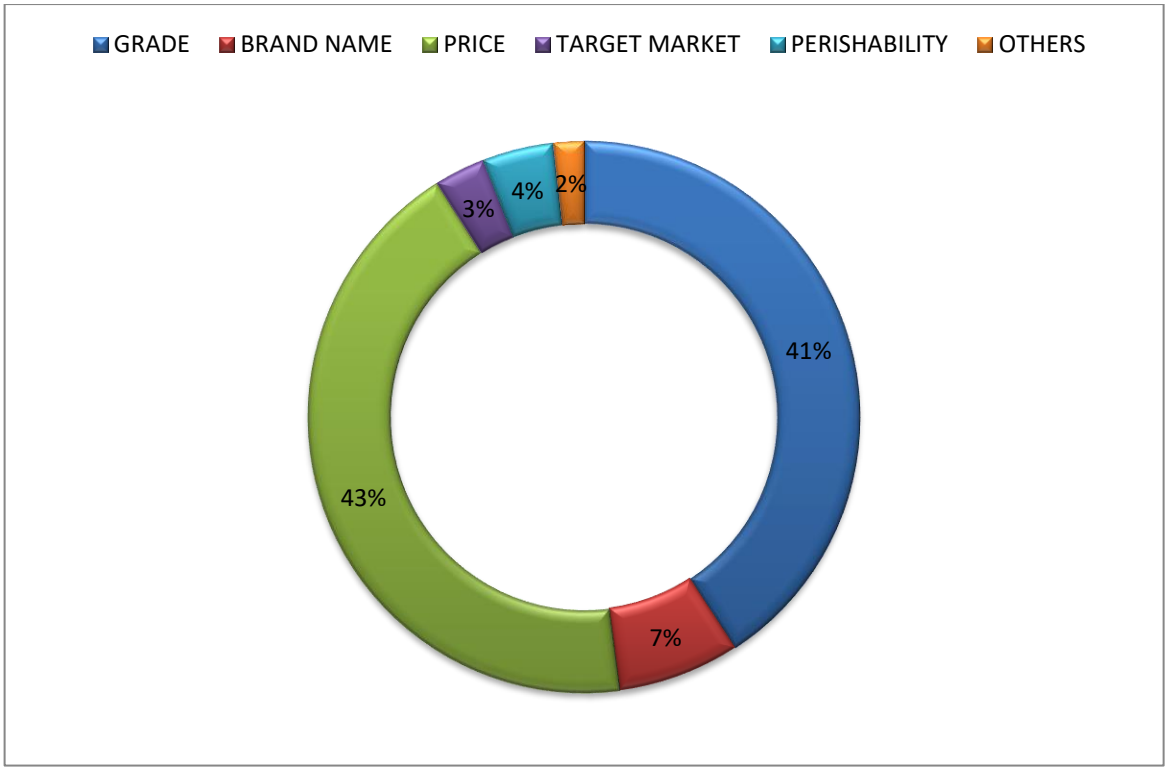

Figure 9: Factors that influence where fruit and vegetable retailers purchased their agriculture produce stock (N=200)

4.1.4. Knowledge of the existence and purpose of the Agricultural Product Standards Act

The vast majority (89%) of respondents did not know of the existence of the Agricultural Product Standards Act of South Africa. Nevertheless majority (88%) of them did not know which department enforces the Agricultural Product Standards Act. Only a few (9%) of them correctly indicated that the Department of Agriculture Forestry and Fisheries enforces the Act. Furthermore, the majority (84%) of the respondents did not know the purpose of the Agricultural Product Standards Act. Only a few (13%) of them correctly identified the purpose of the Act (Table 3).

Table 3: Respondents' Knowledge of the existence and purpose of the Agricultural Product Standards Act of South Africa (N=199)

Research Question		Research Answers	Frequency (%)
2.1.1	Do you know there Agricultural Product Standards Act in South Africa?	Yes	22(11)
		No	178(89)
2.1.2	Which of the following department enforces the Agricultural Product Standards Act?	NDOH	4(2)
		DAFF	18(9)
		DEA	2(1)
		No idea	176(88)
2.2.1	Which of the following is the correct purpose of the Agricultural Product Standard Act?	To provide for breading…	2(1)
		Prohibit sales of products	26(13)
		To provide for measures…	4(2)
		No idea	168(84)
		No idea	97(48.5)

Table 4: How agricultural food produce vendors from different vending locations differed in their knowledge on the existence of the Agriculture Product Standards Act of South Africa (N=199)

Knowledge and awareness parameters		Q1.5 Agricultural food produce vending sites			p-value
		Registered street vending sites	Unregistered street vending sites	Taxi/Bus/Train stations	
2.1.1 Do you know there is Agricultural Product Standards Act in South Africa?	Yes	12(10.4)	2(6.1)	8(17.4)	0.015
	No	106(88.7)	31(93.9)	38(82.6)	
	Total	119(100)	33(100)	46(100)	
Significance at $p \leq 0.05$, according to ANOVA					

Table 5: Correlations between knowledge of the existence of the Agriculture Product Standards Act and knowledge of the purpose of the Act of South Africa (N= 199)

	2.1.1 Do you know that there is the Agricultural Product Standards Act in South Africa?	**2.2.1 Which of the following is the correct purpose of the Agricultural Product Standard Act?**	**2.5.1 The reason for the grading of agricultural products**
2.1.1 Do you know that there is the Agricultural Product Standards Act in South Africa?	1.000	0.629**	0.202 Correlation coefficients(R)

****. Correlation is significant at the 0.01 level (2-tailed), according to Spearman's correlation analysis test**

4.1.5 The effect of education level and years of agricultural food produce retailing experience on knowledge of the purpose of the Agriculture Product Standards Act

There was a significant ($p \leq 0.05$) difference in how respondents from different types of vending sites knew the existence of the Agriculture Product Standards Act with those from registered vending sites being more knowledgeable on the existence of the Act (Table 4). There was a significant positive correlation ($r = 0.629^{**}$, $p \leq 0.05$) between the knowledge of the existence of the Agricultural Product Standards Act and the knowledge of the purpose of the Act (Table 5).

Respondents within different education levels differed significantly ($p \leq 0.05$) on their knowledge of the purpose of the Agriculture Product Standard Act. The crosstab analysis showed that more individuals with a certificate/diploma/degree (40%) followed by those with a matric certificate (20%) were more knowledgeable on the purpose of the Agriculture Product Standards Act compared to those without a matric certificate (9.7%). Therefore,the higher the level of education, made the respondents to be knowledgeable on the Agriculture Product Standards Act (Table 6). The respondents with different duration of agriculture food produce retailing experience differed significantly ($p \leq 0.05$) on their knowledge of the purpose of the Agriculture Product Standards Act. Those with 5-9 years (20.7%) of experience were found to be relatively more knowledgeable compared to those between 10-20 years (16.4%), below 2-years (11.5%), and lastly those between 2-4 years (7.4%) (Table7).

Table 6: How respondents with different level of education differ on their knowledge of the Agriculture Product Standards Act of South Africa (N=199)

Knowledge parameters		Q1.3 Level of education			p-value
		Below a matric qualification	**Matric certificate**	**Certificate/Diploma/Degree**	
2.2.1 Which of the following is the correct purpose of the Agricultural Product Standard Act?	To provide for breading, identification and utilisation of genetically superior animals to improve production and performance of animals in the interest of the RSA	1(0.7)	1(2)	0	0.047
	Prohibits sales of products unless sold to prescribed class or grade & complies with standard regarding the quality thereof	**14(9.7)**	**10(20)**	**2(40)**	
	To provide for measures to promote meat safety and the safety of animal products and to establish and maintain essential national standards in respect of abattoirs	3(2.1)	1(2)	0	
	No idea	127(87.6)	38(76.0)	3(60)	
	Total	145(100)	50(100)	5(100)	
NB: Correct response in bold; Significance at p≤0.05, according to ANOVA					

Table 7: How respondents with different duration of agricultural food produce retailing experience differ on their knowledge of the purpose of the Agriculture Product Standards Act of South Africa (N=199)

APS Act knowledge and awareness parameters		Q1.9Years of agriculture food produce retailing experience					p-value
		Under 2 years	**2-4 years**	**5-9 years**	**10-20 years**	**Above 20 years**	
2.2.1 Which of the following is the correct purpose of the Agricultural Product Standard Act?	To provide for breading, identification and utilisation of genetically superior animals to improve production and performance of animals in the interest of the RSA	1(3.8)	1(3.7)	0(0)	0		**0.044**
	Prohibits sales of products unless sold to prescribed class or grade & complies with standard regarding the quality thereof	**3(11.5)**	**2(7.4)**	**12(20.7)**	**9(16.4)**		
	To provide for measures to promote meat safety and the safety of animal products and to establish and maintain essential national standards in respect of abattoirs	1(3.8)	0(0)	2(3.4)	1(1.8)		
	No idea	21(80)	24(88.9)	44(75.9)	45(81.8)	34(100)	
	Total	26(100)	27(100)	58(100)	55(100)	34(100)	
Significance p≤0.05, according to ANOVA							

4.1.6. Knowledge of the quality and grading of agricultural food produce

Generally, most respondents were knowledgeable on three out of five quality requirements of agricultural food produce as prescribed in the Agriculture Product Standards Act of South Africa. The majority (87%) of the respondents knew that ‘free of infestation and injury’ is the minimum quality requirements of agricultural produce sold in the market. A slight majority (62%) of respondents knew that the quality of agricultural food produce sold in the markets is considered consistent only when it has been graded/classified. Similarly, the majority (75%) of respondents knew that the correct reason for the grading of agricultural food produce sold in the marking is to ‘boost consumers’ confidence and ensure market transparency’. Contrarily, most of the respondents did not know several prescribed classes (grades) of fruit and vegetable (agricultural food produce) sold in the markets while they knew the reasons aboutwhy products are graded or classed (Table 8).

Table 8: Respondents' knowledge of the quality and grading requirements of agricultural fresh produce according to the Agriculture Product Standards Act of South Africa (N=200)

Research Question		**Possible answers**	**Frequency (%)**
2.3.1	According to the quality and grading requirements of the Agriculture Product Standards Act, which of the following is the minimum quality requirement of agricultural produce sold in the market?	**Free of infestation and injury**	**174(87)**
		Free of moisture	6(3)
		Free from sunlight	3(1.5)
		No idea	17(8.5)
2.3.2	According to the quality and grading requirements of the Agriculture Product Standards Act, the quality of agricultural products sold in the market is considered consistent under which of the following conditions?	When it has been inspected	28(14)
		When it has been cooked	1(0.5)
		When it has been graded and classified	**124(62)**
		When it has been refrigerated	11(5.5)
		No idea	36(18)
2.4.1	Which of the following is the correct reason for the grading of agricultural food produce sold in the market?	To ensure the proper shape and size of the produce	1(0.5)
		Product type	11(5.5)
		To boost consumers' confidence and ensure market transparency	**150(75)**
		To safeguard the ingredients of produce	3(1.5)
		No idea	35(17.5)
2.4.2	How many classes (grades) are prescribed for retail fruits produce?	One	6(3)
		Two	15(7.5
		Three	49(24.5)
		Four	**28(14)**
		No Idea	102(51)
2.4.3	How many classes (grades) are prescribed for retail vegetable produce?	One	7(3.5)
		Two	11(5.5)
		Three	48(24)
		Four	**42(21)**
		No Idea	92(46)

4.1.7. Knowledge of labeling and packaging requirement of agricultural fresh produce

The vast majority (77.5%) of respondents correctly indicated ‘display accurate and relevant information’ as the main objective of the marking requirements prescribed in the Agriculture Product Standard Act. The majority (70%) of respondents also correctly indicated the ‘name, type, quantity, and picking date’ as the correct information that must appear on containers containing fresh agricultural food produce. Furthermore, the majority (75 %) of respondents correctly indicated ‘only produce of uniform size, quality, cultivar, ripeness, and colour must be packed together’ as the correct way in which agricultural food produce must be packed together in a package. Conversely, only the minority (46%) of respondents correctly indicated ‘prevent contamination of the produce’ as the main purpose of agricultural food produce package materials (Table 9).

Table 9: Respondents' knowledge of marking and packaging requirements of agricultural fresh produce according to the Agriculture Product Standards Act of South Africa (N=200)

Research Question		Research Answers	Frequency (%)
2.5.1	Which of the following is correct regarding the main objective of the marking requirements on containers containing fresh produce?	**To display accurate and relevant information**	**155(77.5**)
		To provide direction of usage	3(1.5)
		To promoteof products	10(5)
		No idea	32(16)
2.5.2	Which of the following is the correct information that must appear on containers containing fresh agricultural food produce?	Product's ingredients	2(1)
		Product's temperature	2(1)
		The postal address of the country of origin of the produce	9(3.5)
		The name, type, quantity and picking date of fresh produce	**140(70)**
		No idea	47(23.5)
2.6.1	What is the correct way in which agricultural foods produce must be packed together in a package?	**Only produce of uniform same quality, cultivar, ripeness, size, and colour must be packed together**	**150(75)**
		All produce must be placed one by one in their packets	6(3)
		Produce of uniform same quality but from different varieties may be packed together	18(9)
		All Fresh produce must be packed in plastic bags	6(3)
		No idea	20(10)
2.6.2	Which of the following is the correct main purpose of agricultural food produce package materials?	Enables consumers to visualise the produce because of their transparency	11(5.5)
		Prevent contamination of the produce	**92(46)**
		Enables exposure of the produce to air	15(7.5)
		To maintain the weight and shape of the produce	52(26)
		No idea	30(15)

4.1.8. Knowledge of penalty requirements

Only a small minority (15%) of respondents knewthat an Executive Officer designated by the Minister of Agriculture is the responsible person (Agriculture Food Inspector) who can order the seizure of non-complying fresh agricultural produce sold in the market while the majority (58.5%) had no idea. The minority (36.5%) of respondents knew that any person (agriculture food producer) who contravenes or fails to comply with the provisions of the Agriculture Product Standards Act has committed an offence while the majority (56.5%) them had no idea. Only a few (13.5%) respondents correctly indicated that a person (agriculture food producer) found guilty of an offence under the Agriculture Products Standard Act of South Africa by a magistrate's court is liable to a fine or imprisonment for up to 2 years while the majority (58.5%) had no idea (Table10).

Table 10: Respondents' knowledge of compliance and penalty requirements of the Agriculture Product Standards Act of South Africa (N=200)

Research Question		**Research Answers**	**Frequency (%)**
2.7.1	Which of the following is correct regarding the person (agriculture food produce vendor) who can order the seizure of non-complying fresh agricultural produce sold in the market?	The South African Police service	9(4.5)
		An executive officer designated by the minister of agriculture	**30(15)**
		The health inspector designated by the minister of Health	44(22)
		No idea	117(58.5)
	Research Question	**Research Answers**	**Frequency (%)**
2.7.2	Any person (agriculture food producer) who disobey or refuse to conform with the requirements of the Act shall be found guilty of what?	**An offence**	73(36.5)
		Bribery	5(2.5)
		Sin	2(1)
		Negligence	7(3.5)
		No idea	113(56.5)
2.7.3	Which of the following penalty can be imposed ona person (agriculture food produce vendor) found guilty of an offence under the APS act by a magistrate's court?	Liable to a suspension for a period not exceeding 2 years	5(2.5)
		Liable to a special dispensation	7(3.5)
		Liable to a warning	44(22)
		Liable to a fine or to imprisonment for up to 2 years	**27(13.5)**
		No idea	117(58.5)
2.7.4	Which of the following is the correct appeal process for any person (agriculture food produce vendor) whose interest has been negatively affected by any decision of an executive officer at the department of agriculture?	Make an appeal at the police station	8(4)
		Make an appeal at the Court	3(1.5)
		Make an at the Director General of the Department of Agriculture	**52(26)**
		No idea	137(68.5)

4.2. COMPLIANCE OF FRUITS AND VEGETABLES WITH THE CRITERIA OF THE AGRICULTURAL PRODUCT STANDARDS ACT OF SOUTH AFRICA

4.2.1 Compliance of fruits and vegetables with the quality criteria of the Agricultural Product Standards Act of South Africa

Only a small majority of fruit (51.5 %) and vegetable (56 %) retailers indicated that their agricultural fruit products have been monitored and only a small majority of these fruits (56.7%) and vegetable (58.9%) were graded /classified according to the grading quality requirements. The vast majority of fruits (from 86% to 99.8%) and vegetables (from 85.4% to 97.5%) met all the various quality requirements. Regarding the labelling requirements, only the minority (43.3%) of fruits had the packing code indicated on their packages while the majority of them (from 53.9% to 84.7 %) met all the other labelling requirements. On the other hand, the majority of vegetables (from 52.3% to 83.7 %) met all the vegetable labelling requirements. Regarding the packaging criteria requirements, the vast majority of fruits (from 87.1% to 98.5%) and vegetables (79.9% to 95.7%) met all the various packaging criteria requirements (Table 11, Table 12).

Table 11: Compliance of fruits to criteria with the Agricultural Product Standards Act of South Africa

ASSESSMENT	COMPLIANCE FREQUENCY (%)
Criteria 1: Monitoring and enforcement	
1.1 Monitoring	239(51.5)
Criteria 2: Grading quality criteria	
2.1 Evidence of grading	263(56.7)
Criteria 3: Quality criteria of fruits	
3.1 Well-formed shape	434(93.5)
3.2 Free from plant injurious organism	437(94.2)
3.3 Free from any infestation of Arthropoda	405(87.3)
3.4 Free from any organism which may be a source of danger	416(89.7)
3.5 Not underdeveloped or out of season	418(90.1)
3.6 Free from cracks	412(88.8)
3.7 Free from blemishes	399(86.0)
3.8 Free from injuries	436(94.0)
3.9 Free from bruises	435(93.8)
3.10 Not Decay	448(96.6)
3.11 Free from cold damage / frost damage	456(98.3)
3.12 Free from black fungal growth	414(89.2)
3.13 Free from visible chemical residues	463(99.8)
3.14 Not Malformed	459(98.9)
3.15 Not Overripe	448(96.6)
Criteria 4: Labelling criteria	
4.1 The name of trademark and Physical address of producer importer or packer has been indicated on the label	393(84.7)
4.2 Producer code or Pack house code has been indicated on the label	331(71.3)
4.3 Expression Class1, 2, 3 or Lowest class on the label	287(61.9)
4.4 Size of fruits has been indicated on the label	297(64.0)
4.5 Number of counts/weight of fruits has been indicated on the label	271(58.4)
4.6 Name the type of fruits has been indicated on the label	293(63.1)
4.7 Packing code has been indicated on the label	201(43.3)
4.8 Country of origin has been indicated on the label	286(61.6)
4.9 Appropriate cultivar has been indicated on the label	250(53.9)
Criteria 5: Packaging criteria	
5.1 The fruits are of the same quality	457(98.5)
5.2 The fruits are of the same cultivar	404(87.1)
5.3 The fruits are wrapped separately (Avocados)	
5.4 The fruits are clean, dry, undamaged and proper	448(96.6)
5.5 The fruits are odour free	453(97.6)

5.6 The fruits are free from any visible sign of fungus growth	449(96.8)
5.7 The fruits are free from Arthropoda infestation	434(93.5)
5.8 The fruits are strong and rigid enough to ensure that the original shape isretained and not bulge out, has dents, breaks or tears, to the extent that fruits are damaged or are at risk of being damaged, during normal storage, handling or transport.	452(97.4)
5.9 Only fruits of the same quality,cultivar, ripeness, and size shall be packed together in the same container	422(90.9)

Table 12: Compliance of vegetables with the criteria of the Agricultural Product Standards Act of South Africa

ASSESSMENT	COMPLIANCE FREQUENCY (%)
Criteria 1: Monitoring and enforcement	
1.1 Monitoring	223(56)
Criteria 2: Grading quality criteria	
2.1 Evidence of grading	234(58.9)
Criteria 3: Quality criteria of fruits	
3.1 Well-formed shape	388(97.5)
3.2 Free from plant injurious organism	362(91.0)
3.3 Free from any infestation of Arthropoda	368(92.5)
3.3 Free from any organism which may be a source of danger	340(85.4)
3.4 Intact	368(92.5)
3.5 Free from cracks	349(87.7)
3.6 Free from blemishes	344(86.4)
3.7 Free from injuries	345(86.7)
3.8 Free from bruises	349(87.7)
3.9 Free from external moisture	359(90.2)
3.10 Free from foreign odours	369(92.7)
3.11 Free from cold damage / frost damage	386(97.0)
3.12 Free from sun scorch	369(92.7)
Criteria 4: Labelling criteria	
4.1 The name of Trademark and Physical address of the producer importer or packer vegetables is indicated on the package	333(83.7)
4.2 Expression Class1, 2, 3 or Lowest class is indicated on the label of vegetables	233(58.5)
4.3 Name or type of vegetables is indicated on the label	268(67.3)
4.4 Picking date vegetables is indicated on the label	208(52.3)
4.5 Country of origin of vegetables is indicated on the label	276(69.3)
Criteria 5: Packaging criteria	
5.1 Packages of vegetables are of the same quantity	378(95.0)
5.2 Packages of vegetables are of the same cultivar	380(95.5)
5.3 Packages of vegetables are of the same size	333(83.7)
5.4 The visible part of the vegetable packages are representative of its entire contents	336(84.4)
5.5 Packages of the vegetables are clean, dry and odourless	318(79.9)
5.6 Packages of the vegetables are of quality and cannot cause external & internal damage to food products	381(95.7)

4.2.2 An assessment of overall compliance of fruits and vegetables with therequirement of the Agricultural Product Standards Act of South Africa

Regarding the overall compliance with the quality criteria of the Agricultural Product Standards Act of South Africa, the majority of fruits (58%) and vegetables (65%) respectively had high compliance while a few fruits (36%) and vegetable (13%), respectively, had moderate compliance. Only 6% of the fruits had a low overall compliance compared to 22% of vegetables (Figure 10 & 11). Moreover, there was a significant positive correlation between monitoring by officials and the level of compliance of the fruits sold by the vendors (0.520**, $p \leq 0.01$) and vegetables (0.424**, $p \leq 0.01$), with the quality criteria of the Agricultural Product Standards Act of South Africa (Table 13).

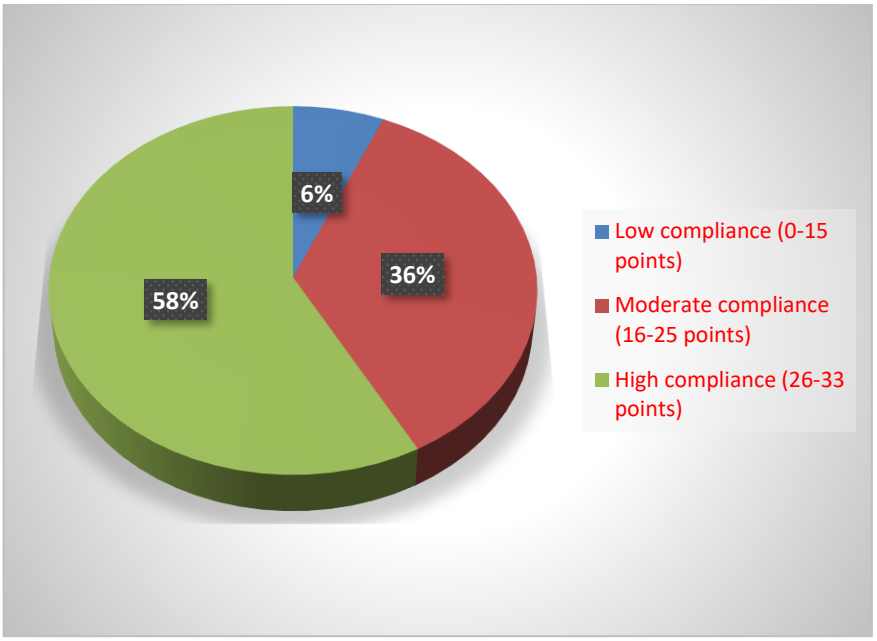

Figure 10: An overall assessment of the compliance of fruits with the quality criteria of the Agricultural Product Standards Act of South Africa

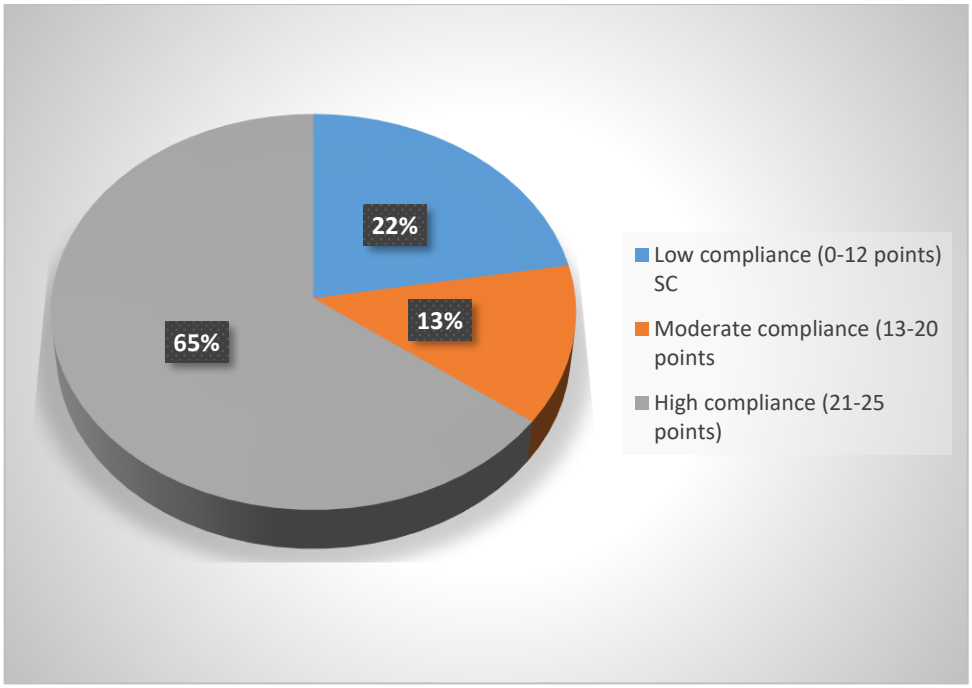

Figure 11: An overall assessment of the compliance of vegetables with the quality criteria of the Agricultural Product Standards Act of South Africa

Table 13: Correlation between monitoring by officials and the compliance score of vendors' fruits (N=464) and vegetables (N=398) with the quality criteria of the Agricultural Product Standards Act of South Africa

	FRUIT MONITORING SCORE
Overall fruit compliance Score	0.520**
	VEGETABLE MONITORING SCORE
The overall vegetable compliance score	0.424**
**. Correlation is significant at the 0.01 level (2-tailed), according to Spearman's correlation analysis	

CHAPTER 5: DISCUSSION

5.1. KNOWLEDGE AND AWARENESS OF THE AGRICULTURAL PRODUCT STANDARDS ACT BY VENDORS

This chapter delivers a complete discussion of the results of socio-demographic details of respondents, the characteristics of the agricultural fresh produce vendors'sites, and knowledge of the existence and purpose of the Agricultural Product Standards Act of respondents. Plus, the knowledge ofthe quality and grading of agricultural fresh produce by respondents, knowledge on marking and packaging requirement of agricultural fresh produce of respondents,and knowledge on compliance and penalty requirements. Also the results of the quality of fruits and vegetables as prescribed by the Regulations relating to grading, packing and marking of agricultural produce intended for sale in the Republic of South Africa will be covered as well as the level of monitoring of fruits and vegetables .

5.1.1 Socio-Demographic Details of Respondents

The majority of the respondents were males. The reason for this is that males can cope better with the harsh street vending environment, which includes weather changes, pollution, and traffic congestions, than their female counterparts (Alimi, 2016). According to Arjun (as cited in Mthombeni, 2018), the low percentage of female vendors selling agricultural produce may also be due to insecurity and fear of harassment by criminal elementsafter working hours. Furthermore, street vending is laborious and is conducted under harsh conditions hence. It is harder for women to carry out such activities (Gamieldien and van Niekerk, 2017; Martínez *et al*. 2018).The majority of respondents in this research were single and young hence,most of them had not settled in life and not ready to marry probably due to low income from vending (Hill *et al.* 2018).

This is consistent with findings from a study conducted in the street of Kigali, Rwanda (Uwitije, 2016) and Enugu City, Nigeria (Onodugo *et al.* 2016) in which most street vendors were found single.

The vast majority of respondents had not obtained a matric qualification and the reason for this could be that they did not attend a school or dropped out because the idea seemed out of space (Mathaulula *et al.* 2016). Furthermore, the majority of black South Africans never had the opportunity to go to school pre-1994 during the apartheid era as there was the social, political, and economic exclusion of individuals who were from the non-white race (Maseko *et al.* 2015).

Currently, in South Africa, individuals need to at least have a matric qualification to stand a chance of getting a job that pays at least a minimum wage, hence in many developing countries street vending is the quickest and easiest way to make money for people without formal qualifications (Alimi, 2016). This is in agreement with a study conducted in Brazil by Martínez *et al.* (2018) and in Vietnam by Samapundo *et al.* (2016) confirming that the majority of street vendors were school leavers, i.e. without formal qualifications.

The majority of the respondents were young and middle-aged adults of less than 45 years. The reason for this age group could be a lack of opportunities in the formal sector and a high rate of joblessness especially for individuals without a matric qualification (Chauke *et al.* 2015). Mathaulula (2016) in his study about "Contribution of Small-scale Food Vending to Rural Livelihoods in Thulamela Municipality of Limpopo Province, South Africa" also found that most people who lived in poverty-stricken areas were either not educated or had no sufficient abilities to secure a living wage job for survival.

5.1.2 The Characteristics of the agricultural food produce vending sites of the respondents

The reason why the majority of respondents sold their agricultural food produce on registered street vending sites is that in South Africa street vendors are required by law to register their street vending site with the relevant municipality to get a permit to operate their business (Municipal Systems Act, 2000). Unregistered street vendors are likely to be forcefully evicted by law enforcement agents (McKay *et al.* 2016; Onodugo *et al.* 2016). The vast majority of street vendors worked between 6-7 days a week because street vending is their only source of income for vendors (Trafialek *et al.* 2017). This entails that the more number ofselling days will increase their income (McKay *et al.* 2016). Furthermore, the customers of street vendors are available on a daily basis (Gamieldien and van Niekerk, 2017). This finding is similar to the finding of a study concluded in Venda, South Africa in which the majority of vegetable vendors sold their produce for 6 to 7 days per week because they wanted to maximise their income (Mthombeni, 2013) and in Colombia by Martínez *et al.* (2018).

The majority of the respondents had been selling agriculture fresh produce for a living for more than 5 years. The majority of them had been doing so for more than 10 years. The reason for this as suggested earlier could be due to limited job opportunities in the formal sector considering that the majority of them were not skilled (Hill *et al.* 2018). Furthermore, street vending is a viable and relatively stable business and most of the vendors are independent entrepreneurs (Rosales, 2013) who do not have to pay tax (Gamieldien and van Niekerk, 2017; Martinez and Rivera-Acevedob, 2018).

5.1.3 Places where agricultural food produce vendors often buy their agricultural food produce and factors that influence their purchasing decisions

The majority of the respondents bought their produce at Tshwane Fresh Produce Market, The reason for this is because Tshwane Fresh Produce Market (TFPM) is a formal wholesale retail outlet of agriculture produce in Tshwane, from which respondents can buy their produce in bulk at a cheaper price (Sirsat *et al.* 2015). Louw *et al.* (2006) stated that most of the customers dominating the Fresh Produce Markets are retailers, vendors and manufactures because they buy in bulk at competitive prices.The minority of respondents bought their produce from Marabastad Retail Market, followed by directly from farms and wholesalers, because at those outlets, business viability, is built on keeping prices comparatively less for buyerswhile providing premium quality of goods (fresh produce) (Brown, 2005, as cited in Van der Heijden and Vink, 2013).

Vendors who stocked from those outlets wanted to make a quick profit by buying less stock because they could not afford to buy in bulk from Tshwane Fresh Produce Market. The majority of the respondents indicated price as the main reason why they bought their produce at TFPM followed by grade because at the market prices are generated everyday based on the actual quality than in retail stores. The market agreement revolves around features of the products sold in the market which is assumed to affect the competition and the practice forming prices (Layade *et al.* 2017).

The price is calculated based on the disposal of products for trade and how much is offered by the buyer, taking into consideration the quality of the produces on trade (Johannesburg Market, 2009). This is in line with the study by Yilmaz and Yilmaz (2008) in their study on “Evaluation of the wholesale market system for fresh fruits and vegetables in Turkey: A case study from Antalya Metropolitan Municipality”. The study found that the pricing of

fresh produce is determined by the Price Determination Commission every morning, taking into account the freshness of the produce quality andrequest of purchasers into consideration.

5.1.4 Knowledge of the existence and Purpose of the Agricultural Product Standards Act

The reason why the majority of respondents did not know of the existence and purpose of the Act by the Department of Agriculture Forestry and Fisheries of South African can be attributed to lack of training or sensitization of street vendors of agricultural produce. Most of the vendors were running informal businesses hence were not informed on the rules and regulations of doing businesses (Mathaulula, 2016). Previous studies by Hill *et al.* (2018) revealed that street vendors in Cape Town were doing so without permits due to unawareness of legislation and because of the informality characteristic of their businesses. Therefore, according to Dal Molin Cortese *et al.*(2016) and Singh *et al.* (2016) relevant authorities need to educate and inform street vendors who sell agricultural produce on the existence and purpose of regulation and bylaws so that they adhere to them when doing their business on the streets.

The reason why respondents from registered vending sites were significantly more knowledgeable compared to those from unregistered vending sites could be attributed to learning about the bylaws during the registration at TFPM. They migh also have been educated by the registration authorities during registration.Wholesale markets are constructed and authorities control their undertakings with rules put into practice outlining and distinguishing the buying and selling activities of the market (Yilmaz and Yilmaz, 2008). According to Louw *et al*. (2008) on “the Role of Fresh Produce Markets in South

Africa," street vendors are accommodated when coming to the education on activities of the market and how to utilise them.

The strong significant positive correlation between the knowledge of the existence of the Agricultural Product Standards Act and the knowledge of the purpose of the Act implies most respondents who knew the existence of the Act also knew its purpose. This means if street vendors are sensitised on the existence of the Act there is a good chance that they will seek to know the purpose and contents of the Act, which is to afford consumers with products of reliable quality through appropriately practical quality standards (DAFF, 2018). According to Gereffi *et al* .(2005) as stipulated in DiFonzo *et al.* (2019), authority's procedures are associated with the degree of knowledge and awareness that can be transmitted from person to person The significance of the correlation results to the authorities is to train street vendors about the Act and its purpose, which will result in improvement in their knowledge level and understanding of the Act, so that they can make, informed buying decisions.

5.1.5 The effect of education level and years of agricultural food produce retailing experience on knowledge of the purpose of the Agriculture Product Standards Act

Respondents with higher academic qualifications were significantly more knowledgeable than those with lower ones. This can be attributed to the fact that street agricultural produce vendors with higher qualifications may possess a high aptitude and are more likely to read and gather information (Samapundo, 2016; Sibanyoni *et al.* 2017). Conversely, higher years of agriculture food produce retailing experience did not make the vendors more knowledgeable on the Agriculture Product Standards Act hence training on the Act is essential (Samapundo *et al.* 2016; Sun *et al.* 2012).

5.1.6 Knowledge on quality and grading, labellingand packaging requirements of agricultural food produce

The reason why most of the respondents were knowledgeable on the minimum quality requirements for agricultural food produce could be attributed to the fact that nowadays consumers are better informed and demand quality produce hence vendors are forced to seek knowledge on the quality requirements of products driven by consumer demands (Rouphael 2018; Wongprawmas and Canavari, 2017). According to Hooge *et al*. (2016) (as cited in Jaeger *et al.* 2018), minor deviations in the quality of agricultural food produce can negatively affect a consumers' decision to purchase them. Therefore, a consumer's intention to buy agricultural produce rests on the quality of the produce at the point of sale (Louis and Lombart, 2018).

The vast majority of the respondents did not know the exact number of classes (grades) of retail fruits and vegetables s prescribed by the Agriculture Product Standards Act. The reason for this could be attributed to the fact that they were ignorant and not aware of the Act According to di Carlo (as cited in Ayyub, 2010) ignorance means when somebody unintentionally or purposely neglects appropriate facts. This has led t ounawareness of the grades provided in the retail of fruits and vegetables. Roberts, (2018) defines ignorance as an absence of awareness or facts, which can be caused by authorities.

A huge proportion of respondents correctly indicated 'display accurate and relevant information' as the main objective of the marking requirement prescribed in the Act. This can be attributed tothe experience they acquired since purchasing agricultural produce at the market most of the produce from wholesalers are marked. Marketing boundaries entail grading, packing, stuffing, dispatching, shipping, storing, and tariffs (Mogaji *et al.* 2013).

Supplier-branded products (fresh produce) offer produce information and are usually priced higher than competitors in the market (Endo, 2014).

The majority of respondents also correctly indicated ‘name, type, quantity, and picking date’ as the correct information that must appear on the containers containing fresh agriculture produce. The reason for this could be experience acquired after working in the industry for a long time. Market agents at TFPM work under the Marketing of Agricultural Products Act, 1996 (Act 47 of 1996), which entails the grading, packing, and marking of agricultural products as well as selling the products. Prince *et al.* (2019) study revealed that if a vendor (fresh produce) requests information from a market agent and shows interest and skill of completely perceiving the intended meaning ofthe product (fresh produce) information positively, then it will be memorable.

Moreover, the majority of respondents correctly indicated that ‘only produce of uniform size, quality, cultivar, ripeness, and colour must be packed together in one package. The reason might be due to the experience they have acquired in the trade. As time goes by, and the more time is spent at the market by the street vendors they will become more experienced regarding fresh produce matters which will make them more knowledgeable on trade products (Fresh produce) than the newcomers in the market (Prince *et al.* 2019). This is similar to a study by Dessalegn *et al.* (2016) that revealedthat the majority of fruit vendors in their study lacked marketing experience because they were in the business for less than six years.

The reason why the majority of respondents did not correctly indicate ‘prevent contamination of the produce’ as the main purpose of agricultural produce package materials can be attributed to lack of training on food package materials by the authorities. The consequence of the lack of training on food packaging material is that important

information is missed regarding the quality of fruits and vegetables which can be read from the packaging material (Heising *et al.* 2014). In the study by McFadden and Huffman (2017) titled "Willingness-to-pay for natural, organic, and conventional foods: The effects of information and meaningful labels they stressed the importance of government in sensitizing consumers (vendors) about the packaging of products (agricultural produce).

5.1.7 Knowledge on penalty requirements

The majority of the respondents did not know that an Executive Officer designated by the Minister of agriculture can order the seizure of goods of fruits and vegetables for noncompliance. The reason for this is of lack of knowledge and awareness of the prescription of the Act by the government. According to Chanda *et al.* (2010) knowledge, teaching, lessons, and conveyance of message to the community and other interested parties together with the development of executives typically occurs in isolated divisions of the South African government state departments. Subsequently, DAFF as the custodian of the Agricultural Product Standards Act, 119 of 1990 is responsible for training stakeholders about the prescription of the Act. A previous study by Marumo and Mabuza (2018) revealed that the government of South Africa did not recognise street vendor's contribution to the economy and recommended (that the Department of Small Business Development) create integrated programmes to capacitate street vendors.

The majority of the respondents did not know that anyone who contravenes the Act would have committed an offence and that anyone who was found guilty by a magistrate was liable to a fine or face imprisonmentup to 2 years. The reason for this is lack of knowledge and awareness of the prescription of the Act. The absence of knowledge can impact on operating without information or accidentally obtaining superficial information or obtaining appropriate information that poses doubt (Ayyub, 2010). Therefore the

stakeholders of the Act need to get accurate and relevant information about its prescription to advance their businesses mainly on issues involving quality and safety of the food (fresh produce) they are vending (Marumo and Mabuza, 2018).

5.2. COMPLIANCE OF FRUITS AND VEGETABLES PRODUCE WITH THE CRITERIA OF THE AGRICULTURAL PRODUCT STANDARDS ACT

5.2.1 Monitoring

Only a small proportion of fruit (51.5 %) and vegetables (56 %) retailers indicated that their agricultural fresh produce had been monitoredby authorities. This could be attributed to the lack of resources such as vehicles and the insufficient number of inspectors to conduct monitoring and enforce regulations (Ahmad *et al.* 2018; Al-Kandari and Jukes 2012). A study on Food control in Zimbabwe: "A situational analysis that described and compared the existing system with the future food control systems as defined in the "draft Food Control Bill 2011" by Pswarayi *et al.* (2014) also revealed the lack of vehicles and inspection kits as the principal reason for the lack of inspection.

Non-monitoring by authorities can result in the selling of non-conforming agricultural produces such as those with high levels of pesticide residues (Krejcˇová *et al.* 2016; Mditshwa *et al.* 2017) and phosphate residue (Zhang, 2013) to consumers. High levels of chemical residues can be harmful to consumers' health (Getaneh and Mezgebu, 2019; Mditshwa, 2017; Colla *et al.* 2018).

Inspectors often collect samples of produce and test them for the concentration presence of harmful pesticides and other substances (Mutengwe *et al.* 2016b). Therefore, according to Goddard, Muringai and Boaitey (as cited in Manning and Monaghan, 2019) creating strategies in the supply-chain and principles that guaranteethe integrity of the food will

improve the safety of food, legitimacy, quality, andgrowth in consumer's trust in produce rights.

5.2.2 Grading

Only a small majority of these fruits (56.7%) and vegetable (58.9%) were graded /classified according to the grading quality requirements. The reason why a substantial amount of agricultural products were not graded could be that they were from emerging farmers. They are not grading their products because of stringent grading rules in the market. Big businesses accept produce from emerging farmers as a means of increasing growth in th economy and for poverty alleviation even if they do not meet market requirements (Tirra *et al*. 2019).

The Fresh Produce Market also has permitted emerging farmers to bargain at the market, and trade their produce effortlessly, as the barricades to enter a market can be unattainable because Wholesalers and representatives of the markets have no interest in buying small, inconsistent quantities and /or variable quality fruits and vegetables from emerging farmers (NAMC, 2000, as cited in Louw, 2008). This is in agreement with Singh (1994) explaining that stringent grading rules was one of the causes encountered by emerging farmers in his study,or it could be that farmers sold their produce to cooperatives which would sell those products to the official market because farmers were only interested in return on investment (Agbo *et al.* 2015).

Grading is a vital step before marketing (Sivakumar and Wall, 2013). Grading is a significant stage where farmers set prices for fruits and vegetables that will be sold at the market. Fruits and vegetables are typically graded based on sizing, mass, and outer pigment of the skins (Kumar *et al.* 2018). Fresh Produce Markets generate a platform for trading as they generate price for the produce and to enable the market and supply of fruits

and vegetables on a deal of level playing field (Knowles, 2015). The benefits of grading for the agricultural produce street vendors at the Fresh Produce Market is that the produce is priced fairly based on its grades. The quality of fruits and vegetables deteriorate daily at the market that is why the pricing is done every day in the market (Hou and Liu, 2017).

For consumers, the benefits of grading are getting value for their money because the extrinsic factors of fresh produce have a high impact on the price of fresh produce (Bhargava and Bansal, 2018). The consumer's decisiveness is based on quality perception (Palma *et al.* 2015). Consumers are prepared to pay high prices for the superior quality of fresh produce (Kapoor and Kumar, 2015). Products are graded to obtain an overall indication of the quality. Fresh produce is not graded correctly, for example, colour or size of the produce are not the same in the package, consumers will often incline to pay less for such produce (Mditshwa *et al*. 2017, as cited in Kyriacoua and Rouphael, 2018). Fresh produce is also graded to meet the requirements of set standards for quality and packaging of a specific market (Shewfelt *et al.* 2014). Furthermore, the study indicated that retailers packaged their produce in propylene bags as prescribed by regulation and bought less produce that will last a day.They sorted fruits based on maturity, and selected and disposed ofspoiled or overripen fruits daily. This is consistent with Dessalegn *et al.* (2016) studies which discussed the various ways in which fresh produce vendors in their study reduced after harvest losses.

5.2.3 Quality

The vast majority of fruits (ranging from 86% to 99.8%) and vegetables (ranging from 85.4% to 97.5%) met all the various quality requirements in the Agricultural Product Standards Act. Quality features can define produce quality, to farmers quality is considered as producing a large numberof crops; fighting diseases; effortlessness harvesting; perfect appearance; and minor blemishes as well as good distribution quality

(Heising *et al.* 2014) . Although vendors and wholesalers look at the quality based on how the produce appears such as its texture and the period during which it remains consumable (Rouphael, Schwarz, Krumbein, & Colla, 2010; Zhang *et al.* 2014, as cited in James and Zikankuba, 2017). The credit for high compliance goes to producers of fruits and vegetables. Farmers have the responsibility of complying with regulations. If farmers do not comply with Quality regulations, they will be sidelined through not being able to sell in big markets as specified by Louw *et al.* (2007). They will be able to only sell in informal markets like street corners and bus stations, train station, and taxi rank (Haydam *et al.* 2015).

According to Cantwell (as cited in Piližota, 2014) to produce premium quality produce that will entice a first-class price market, it is of great advantage for the farmers and the stakeholders of fresh produce to take note of selection of a variety of crops, climate settingsand farming ways during harvesting, that will be beneficial to the quality of fruits and vegetables. In addition, by applying registered chemicals to increase production during pre-harvest to the produce ensures good quality (Donkor *et al.* 2016). Moreover, the market can also be given credit for maintaining the quality of fresh produce by storing it appropriately. Inappropriate harvesting and postharvest handling practices affect quality negatively because of decay of the fruits and vegetables. It also declines it sappearance, taste, and nutritional value (Dessalegn *et al.* 2016). The benefit of producing high-quality products is that agricultural products will be marketable at the local market (where respondents stock their produce). Markets exist as a display place to enable the buying and selling in every region and in all nations globally (Knowles, 2015). Fruits and vegetables can be distinguished based on the level of quality, which cannot be bought separately but can be subsidised to the total price ofthe product (fruits and vegetables) (Ghazaryan *et al.* 2018).

According to Rajiv (as cited in Marumo and Mabuza, 2018) consumers in the city usually get fresh produce from two main sources, which is the official market (Supermarkets) and unofficial markets (Street vendors). So by getting quality produce at reasonable prices will meet street vendors' target market demands which are high quality produce that they are willing to pay reasonably for (Yu and. Nagurney, 2013). Studies by Tsakiridou *et al.* (2011) on "Purchasing Fresh Produce on the Basis of Food Safety, Origin, and Traceability Labels" confirm that consumers preferred to buy at the market which was liberated because they got a variety of products at lower costs.

5.2.4 Labelling

A small majority of the packages for fruits (53.9% to 84.7 %) and vegetables (52.3% to 83.7 %) produce met all the other labelling requirements. Labelling could be an influential quality sign enabling consumers' buying choices by the transmission of vital facts regarding pursuit, knowledge, and belief characteristics (Tsakiridou *et al.* 2011). The purpose of the label in a food product is to provide accurate facts to consumers by publishing th efacts according to the requirements of labels regulation (Gezmen-Karadağ and Türközü, 2018).

The majority of the produce complied with the labelling regulations. Farmers are responsible for making sure that their labels comply with the regulations before sending to the formal market. Non-compliance with the labelling requirements is considered fraudulent, where causes can be deliberately or accidentally,or through oversight by human beings, not conforming to the rules of handling the product (fresh produce) correctly or labels amendments during the making or by mistake during the drawing of the logo (Kowalska *et al.*2018, as cited in Manning and Monaghan, 2019). Therefore, it is important to comply with the labelling criteria of the Act. Nawi and Batt (2015) indicated that market representatives required a well-graded, a properly packaged andlabelled

product from farmers to sell their products in the big market. Correct labelling will help educate fresh produce vendors (Kapoor and Kumar, 2015).

5.2.5 Packaging

The majority of the fruit (87.1% to 98.5%) and the vegetables (79.9% to 95.7%) packages complied with the packaging criteria becausethe farmers had to protect and maintain the quality of agriculture produce throughout its food chain until it reaches the consumer (Wani and Singh, 2015). According to Robertson (as cited in Heising *et al*. 2014) the primary purpose of food packaging is to carry the produce at ease, and to preserve the produce from contamination, and to inform the buyers. Packaging safeguards produce from physical injuries, infestation, and eases the movement of produce (Porat *et al.* 2018, as cited in Wyrwa and Barska, 2017). According to Kader (as cited in Porat *et al.* 2018) fresh produce is mainly living plant entities that can spoil easily ring. The consequences of moving produce from farms without being packaged properly will escalate the decay (Dessalegn, 2016). Improper packaging of fresh produce can also result in the produce getting wounded, bruised resulting in the change in colour which ultimately affects the shape of the produce and quality resulting in poor pricing during trade (Woreda Agriculture and Rural Development Office-WARDO, 2014 as cited in Behailu and Kebede, 2018).

Good packaging should be related to proper storage to prevent decay (Musebe *et al.* 2017). The advantage of using proper packaging material as prescribed by the regulations is that the storage life of the produce will be prolonged (Gardas *et al.* 2017).

5.3. AN ASSESSMENT OF OVERALL COMPLIANCE OF FRUITS AND VEGETABLES WITH THE REQUIREMENT OF THE AGRICULTURAL PRODUCT STANDARDS ACT OF SOUTH AFRICA

Much of the agricultural produce observed in this study had high compliance with he quality criteria of the Agricultural Product Standards Act of South Africa. This could be because the majority of the farmers would want to comply with the grading, packing and marking requirements of the Agricultural Product Standards Act to be successful in th eformal sector, which strictly requires agricultural produce to be complying with the criteria of the Act (Nawi and Batt, 2015). In addition, Jacxsens *et al.* (2015) also mentioned in their study that if growers wanted to make it in the official market they must produce quality produce that complies with Regulations. Quality is a progressively significant matter in the promotion of food products (fruits and vegetables) in urban and rural populations (Royer *et al.* 2017). Farmers who want to be successful in selling their agricultural produce in the formal sector must make sure that their produce complies with relevant regulations (Smith *et al.* 2015). The significant positive correlation between monitoring and the level of compliance of fruits (0.520**, $p \leq 0.01$) and vegetables (0.424**, $p \leq 0.01$) to the quality criteria of the Agricultural Product Standards Act of South Africa, which indicates that monitoring is a major contributor to compliance with the Act. A study by Shukla *et al*. (2018) also recommended to the Indian government that to sustain Standards of local and export they should improve the current regulations which must be reinforced by effectively taking robust court actions. It further indicated that more emphasis should be put on careful monitoring of main markets in place of inspections to ensure that precise products (fruits and vegetables) are displayed on the shelves. On top of that studies by Kettunen *et al*. (2015) confirmed that actions to enforce food laws in

Finland seemed to be an operative measure for making food business operators fix violations of food welfare, and this has lead a huge number of them to comply.

The The purpose of this research was to investigate knowledge and awareness of the Agricultural Product Standards Act by vendors, compliance of fruits and vegetables produce with the criteria of the Agricultural Product Standards Act, and an assessment of overall compliance of fruits and vegetables with the requirement of the Agricultural Product Standards Act of South Africa. Chapte 5 presented findings for this study, which established lack of knowledge regarding some aspects of the Act, high compliance to the quality criteria of fruits and vegetables and limited monitoring of agricultural fesh produce sold by vendors in the streets of Tshwane metropolis. The next Chapter outlines conclusions , provide the implications of the results, reveals limitations of the present state of the study and recommends research for future study in the related field.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSION

The study findings indicated that the majority of agricultural produce street vendors sold their agricultural fresh produce between 6-7 days a week and had been selling agricultural produce for more than five years. Most of them bought their produce at Tshwane Fresh Produce Market because itspricesis cheaperthan at other wholesalers.

The majority of the street vendors did not know of the existence and purpose of the Agricultural Product Standards Act. Vendors with higher academic qualifications were significantly more knowledgeable on the Agricultural Product Standards Act than those withlower qualifications. However, more years of agriculture fresh produce vending experiencedid not render vendors more knowledgeable of the Act. There was a strong significant positive correlation between the knowledge of the existence of the Agricultural Product Standards Act and the knowledge of the purpose of the Act. The significance of the correlation results to the authorities is to train street vendors about the Act and its purpose, which will result in improvement in their knowledge level and understanding of the Act, so that they can make, informed buying decisions.

The vast majority of agriculture fresh produce street vendors did not know the exact numberof classes (grades) of fruits and vegetables prescribed by the Agriculture Product Standards Act, but the majority of them correctly identified the prescribed objectives of the markingrequirements and the main purpose of agricultural produce packaging. The majority of agricultural fresh produce vendors did not know the correct authority that can order the seizure of non-complying agricultural produce, neither did they know that offenders were liable to a fine or imprisonment for up to two years if they contravened the Agriculture Product Standards Act. A large proportion of fruits and vegetables met all the

various quality requirements in the Agricultural Product Standards Act. Only a small proportion of these fruits and vegetables were graded. A large proportion of the fruits and vegetable packages complied with the packaging requirements. More than half of the packages for fruits and vegetables produce met all the other labelling requirements.The majority of the fruits and vegetables, respectively, had high compliance with the quality criteria while a few fruits and vegetables respectively had moderate compliance with the quality criteria. Only a small percentage of agriculture fresh produce street vendors indicated that authorities had monitored their agricultural fresh produce. There was a significant positive correlation between monitoring and the level of compliance of fruits and vegetables with the quality criteria of the Agricultural Product Standard Act of South Africa, which indicates that monitoring is a major contributor to compliance with the Act.

The implications and significance of these findings are that an effective food control system is vital for the control and monitoring of fresh produce sold in the streets of City of Tshwane Metropolis. This study established adequate quality compliance of fresh produce with the Act. Moreover, The study also identified a gap regarding lack of knowledge of certain aspects of the Act by street vendors, for the Department of Agriculture Forestry and Fisheries to take appropriate corrective measures in closing the gaps. The study further revealed very limited monitoring of fresh produce by authorities of the Department of Agriculture Forestry and Fisheries, which will assist the Department to develop strategies in improving compliance gaps

Further research is recommended to include qualitative methods to explore informal street vendor challenges and their consumer perceptions of the fresh produce they procure from them in the other City of Tshwane Metropolitan or others in South Africa to get the overall level of compliance and knowledge gaps with the Agricultural Product Standard Act of South Africa.

6.2. RECOMMENDATIONS

It is recommended that the Department of Agriculture Forestry and Fisheries should ensure that farmers and street vendors of agricultural produceunderstand the requirements of the Agricultural Product Standard Act. This should be done by organizing free training workshops on the correct quality, grading, packaging, and labeling requirement as prescribed in the Agriculture Product Standard Act. It is also suggested that the authorities develop a database of offenders and ensure that recurring non-compliances with the packing and marking requirements are punished according to the law. The Department should increase the number of Inspectors to ensure sustainable compliance to the Agriculture Product Standard Act.

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APPENDICES

APPENDIX 1: CHECKLIST ON FRESH VEGETABLES

CHECKLIST: VEGETABLES

An Investigation of quality and compliance of agricultural fresh produce in the Tshwane metropolis in terms of the Agricultural Products Standards Act

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PRODUCT QUALITY COMPLIANCE AND MONITORING CHECKLIST

No.

Name of agricultural food product: _____

Region in Tshwane Metropolitan areas_____

CRITERIA: 1Monitoring and enforcement

To determine the level monitoring and enforcement agricultural fresh produce

Q.1	Monitoring and enforcement: fresh vegetables	Tick one (✓)
	1: Monitoring was conducted in the past 4 months	**1**
	2: Monitoring was conducted in the past 8 months	**2**
	3: Monitoring was conducted in the past 12 months	**3**
	4: Monitoring was conducted in the past 2 years	**4**
	5: Monitoring was conducted more than 2 years ago	**5**
	6: No monitoring	**6**

CRITERIA: 2Grading quality criteria

Assessing the quality and grading of agricultural fresh produce sold by farmers in selected retail outlets and markets in Tshwane metropolis

Q2	Grading quality criteria:	Tick one (✓)	
2.1	1: Class 1: It should be in the same container be uniform with regard to colour and ripeness	**1**	
	2; Class 2: it should be in the same container & be uniform with regard to colour	**2**	
	3: Class 3 the same container be uniform with regard to colour and ripeness	**3**	
	4: Lowest Class	**4**	
	5: Not classed	**5**	

CRITERIA: 3 Quality criteria

Rate the degree of compliance of vegetables according to the agricultural product standards regulations of South Africa by ticking (✓) the relevant number (**1: Comply, 2: Not comply)**

Q3	Quality criteria of vegetables (1: YES, 2: NO)	Tick one (✓)	
3.1	3.1 Well-formed shape	**1**	**2**
3.2	3.2 Free from plant injurious organism	**1**	**2**
3.3	3.3 Free from any infestation of Arthropod	**1**	**2**
3.4	3.3 Free from any organism which may be a source of danger	**1**	**2**
3.4	3.4 Intact	**1**	**2**
3.5	3.5 Free from cracks	**1**	**2**
3.6	3.6 Free from blemishes	**1**	**2**
3.7	3.7 Free from injuries	**1**	**2**

3.8	3.8 Free from bruises	**1**	**2**
3.9	3.9 Free from external moisture	**1**	**2**
310	3.10 Free from foreign odours	**1**	**2**
3.11	Free from cold damage / frost damage	**1**	**2**
3.12	Free from sun scorch	**1**	**2**

CRITERIA: 4labelling criteria

Rate the degree of compliance of vegetables according to the agricultural product standards regulations of South Africa by ticking (✓) the relevant number (**1: Comply, 2: Not comply; 3: N/A**)

Q 4	**Compliance of vegetables in accordance to labelling criteria**	**Tick (✓)**		
4.1	The name of trademark and Physical address of producer importer or packer vegetables is indicated on the package	**1**	**2**	**3**
4.2	Expression Class1, 2, 3 or Lowest class is indicated on the label of vegetables	**1**	**2**	**3**
4.3	Name or type of vegetables is indicated on the label	**1**	**2**	**3**
4.4	Picking date vegetables is indicated on the label	**1**	**2**	**3**
4.5	Country of origin of vegetables is indicated on the label	**1**	**2**	**3**

CRITERIA: 5 Packaging criteria

Rate the degree of compliance of vegetables according to the agricultural product standards regulations of South Africa by ticking (✓) the relevant number (**1: Comply, 2: Not comply; 3: N/A**

Q5	**Compliance of vegetables accordance to packaging criteria**	**Tick (✓)**		
5.1	Packages of vegetables are of the same quantity	**1**	**2**	**3**
5.2	Packages of vegetables are of the same cultivar	**1**	**2**	**3**
5.3	Packages of vegetables are of the same size	**1**	**2**	**3**
5.4	The visible part of the vegetable packages are representative of its entire contents	**1**	**2**	**3**
5.5	Packages of the vegetables are clean, dry and odourless	**1**	**2**	**3**
5.6	Packages of the vegetables are of quality and cannot cause external & internal damage to food products	**1**	**2**	**3**

APPENDIX 2: CHECKLIST ON FRUITS

CHECKLIST: FRUITS

An Investigation of quality and compliance of agricultural fresh produce in the Tshwane metropolis in terms of the Agricultural Products Standards Act

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CHECKLIST FOR FRESH FRUITS

PRODUCT QUALITY COMPLIANCE AND MONITRING CHECKLIST

No.

Name of agricultural food product: _____

Region in Tshwane Metropolitan areas_____

CRITERIA: 1Monitoring and enforcement

To determine the level monitoring and enforcement agricultural fresh produce

Q	Monitoring and enforcement: Fresh Vegetables	Tick one(✓)
3.1	1: Monitoring was conducted in the past 4 months	**1**
	2: Monitoring was conducted in the past 8 months	**2**
	3: Monitoring was conducted in the past 12 months	**3**
	4: Monitoring was conducted in the past 2 years	**4**
	5: Monitoring was conducted more than 2 years ago	**5**
	6: No monitoring	**6**

CRITERIA: 2grading quality criteria

Assessing the quality and grading of agricultural fresh produce sold by farmers in selected retail outlets and markets in Tshwane metropolis

Q2	Grading Quality Criteria	Tick one (✓)	
1.1	1: Class 1: It should be in the same container be uniform with regard to colour and ripeness	**1**	
	2; Class 2: it should be in the same container & be uniform with regard to colour	**2**	
	3: Class 3 the same container be uniform with regard to colour and ripeness	**3**	
	4: Lowest Class	**4**	
	5: Not classed	**5**	

CRITERIA: 3Quality criteria of fruits

Rate the quality criteria of fruits according to the agricultural product standards regulations of South Africa by ticking (✓) the relevant number (**1: YES, 2: NO, 3: N/A**)

Q3	Quality Criteria	Tick one(✓)		
3.1	Well-formed shape	**1**	**2**	**3**
3.2	Free from plant injurious organism	**1**	**2**	**3**
3.3	Free from any infestation of Arthropod	**1**	**2**	**3**
3.4	Free from any organism which may be a source of danger	**1**	**2**	**3**
3.5	Underdeveloped or out of season	**1**	**2**	**3**
3.6	Free from decay/ cracks	**1**	**2**	**3**
3.7	Free from blemishes	**1**	**2**	**3**
3.8	Free from injuries	**1**	**2**	**3**
3.9	Free from bruises	**1**	**2**	**3**
3.10	Not Decay	**1**	**2**	**3**
3.11	Free from cold damage / frost damage	**1**	**2**	**3**
3.12	Free from black fungal growth	**1**	**2**	**3**
3.13	Free from visible chemical residues	**1**	**2**	**3**
3.14	Not Malformed	**1**	**2**	**3**
3.15	Not Overripe	**1**	**2**	**3**

CRITERIA: 4 Labelling criteria

Rate the degree of compliance of vegetables according to the agricultural product standards regulations of South Africa by ticking (✓) the relevant number (**1: Comply, 2: Not comply, 3: N/A**)

Q4	Compliance of agricultural fresh produce in accordance to labelling criteria	Tick one (✓)		
4.1	The name of trademark and Physical address of producer importer or packer has been indicated on the label	**1**	**2**	**3**
4.2	Producer code or Pack house code has been indicated on the label	**1**	**2**	**3**
4.3	Expression Class1, 2, 3 or Lowest class on the label	**1**	**2**	**3**
4.4	Size of fruits has been indicated on the label	**1**	**2**	**3**
4.5	Number of counts/weight of fruits has been indicated on the label	**1**	**2**	**3**
4.6	Name of type of fruits has been indicated on the label	**1**	**2**	**3**
4.7	Packing code has been indicated on the label	**1**	**2**	**3**
4.8	Country of origin has been indicated on the label	**1**	**2**	**3**
4.9	Appropriate cultivar been indicated on the label	**1**	**2**	**3**

CRITERIA: 5 Packaging criteria

Rate the degree of compliance of vegetables according to the agricultural product standards regulations of South Africa by ticking (✓) the relevant number (**1: Comply, 2: Not comply, 3: N/A**)

Q5	**Compliance of agricultural fresh produce accordance to packaging criteria**	**Tick one (✓)**		
5.1	The fruits are of the same quality	**1**	**2**	**3**
5.2	The fruits are of the same cultivar	**1**	**2**	**3**
5.3	The fruits are wrapped separately (Avocados)	**1**	**2**	**3**
5.4	The fruits are clean, dry, undamaged and proper	**1**	**2**	**3**
5.5	The fruits are odour free	**1**	**2**	**3**
5.6	The fruits are free from any visible sign of fungus growth	**1**	**2**	**3**
5.7	The fruits are free from Arthropod infestation	**1**	**2**	**3**
5.8	The fruits are strong and rigid enough to ensure that the original shape be retained and not bulge out, dent in, break or tear, to the extent that Fruits are damaged or are at risk of being damaged, during normal storage, handling or transport.	**1**	**2**	**3**
5.9	Only fruits of the same quality. cultivar, ripeness and size shall be packed together in the same container	**1**	**2**	**3**

APPENDIX 3: QUESTIONNAIRE

QUESTIONNAIRE: KNOWLEDGE AND AWARENESS

An Investigation of quality and compliance of agricultural fresh produce in the Tshwane metropolis in terms of the Agricultural Products Standards Act

UNISA university of south africa

AGRICULTURAL PRODUCT STANDARDS ACT KNOWLEDGE AND AWARENESS QUESTIONNAIRE

REGION: _____ DATE: _____

QUESTIONNAIRE NO._____

Part 1: DEMOGRAPHICS AND RETAIL INFORMATION (*Please mark (with x) the appropriate answer)*

SECTION 1: Please choose 1 answer for each question

1.1. What is your gender?

1	Male
2	Female

1.2. What is your marital status?

Single	Married	Divorced	Widowed	Separated
1	2	3	4	5

1.3. Which of the following best describes your highest education level?

Less than matric	Matric certificate	Certificates or diploma	Higher diploma	University degree
1	2	3	4	5

1.4. Race

African	Coloured	Indian	White	Other
1	2	3	4	5

Others_____

1.3. What is your age?

18-25 years	26-35 years	36-45 years	46-55 years	56-65 years	66-75 years
1	2	3	4	5	6

1.6. Which of the following category do you fall under as a retailer?

Registered Vendor	Unregistered Vendor owner	Registered Taxi rank /Bus rank/ Train station
1	2	3

Others_____

1.7. How often do you work in this establishment?

1-2 days a week	3-5 days a week	6 days a week	7 days a week
1	2	3	4

1.8.Years of experience selling agricultural produce

Under 2 years	2-4 years	5-10 years	10-20 years	> 20 years
1	2	3	4	5

1.9 Where do you normally buy/get your agricultural fruits and vegetables

Tshwane Fresh Produce Market	Marabastad retail market	Directly from farmer	From fruit & vegetable wholesalers	Directly from own food gardens	Others
1	2	3	4	5	6

Others_____

1.10. Which of the following influences your choice to select and retail a particular fruit and vegetable produce

Grade	Brand name	Price	Target market	Perishability	Others
1	2	3	4	5	6

Others_____

Part 2: THE AGRICULTURAL PRODUCT STANDARD ACT KNOWLEDGE AND AWARENESS OF FOOD AGRICULTURAL PRODUCE RETAILERS

2.1. Knowledge of the existence of Agricultural Product Standard Act

2.1.1 Do you know the Agricultural Product Standards Act, 1990 (Act 119 of 1990)?

YES	1
NO	2

2.1.2. Which department enforces the Agricultural Product Standard Act?

1	National Department of Health (NDOH)
2	Department of Agriculture Forestry and Fisheries (DAFF)
3	Department of Trade and Industry (DTI)
4	Department of Environmental Affairs (DEA)
5	No Idea / Don`t know

2.2. Knowledge of the purpose of the act

2.2.1. What is the purpose of the Agricultural Product Standard Act?

1	To provide for the breeding, identification and utilisation of genetically superior animals in order to improve the production and performance of animals in the interest of the Republic
2	To consolidate the law relating to the identification of animals and to provide for incidental matters.
3	Prohibit the sale of products unless sold to prescribed class or grade & complies with standard regarding the quality thereof
4	To provide for measures to promote meat safety and the *safety* of animal products and to establish and maintain essential national standards in respect of abattoirs;
5	No Idea / Don`t know

2.3. Knowledge on the correct quality of agricultural fresh produce

2.3.1. The quality of agricultural products sold in the market must comply with the minimum requirements of the act regarding

1	Infestation and injuries
2	Hazards
3	Moisture
4	Light
5	No Idea / Don`t know

2.3.2. The quality of agricultural products sold in the market will be of consistent quality when it is

1	Inspected
2	Cooked
3	Graded or Classified
4	Refrigerated
5	No Idea / Don`t know

2.4 Knowledge on the grading of agricultural fresh produce.

2.4.1. The reason for grading agricultural products is to provide the consumer with what?

1	Product shape
2	Product type
3	Confidence and Market transparency
4	Product ingredients
5	No Idea / Don`t know

2.4.2. The consumer can expect a product of consistent quality when purchasing a specific grade or class allocated to the product. How many classes of fruits are provided for in the Act?

1	One
2	Three
3	Four
4	Two
5	No Idea / Don`t know

2.4.3. The consumer can expect a product of consistent quality when purchasing a specific grade or classified allocated to the product, how many classes of Vegetables are provided for in the Act?

1	One
2	Three
3	Four
4	Two
5	No Idea / Don`t know

2.5. Knowledge on the marking of agricultural fresh produce.

2.5.1. The purpose of marking requirements in the regulations is to advise the consumer with:-

1	The protection the product
2	Accurate and relevant information on a product, so as to allow an informed and personal choice to be made.
3	Direction
4	Promotion of the product
5	No Idea / Don`t know

2.5.2. The following information must appear on the package of agricultural products

1	Product ingredients
2	Product temperature
3	Address of the producer and Country of origin
4	Product name, Class, , Picking date, No. of size of fruits
5	No Idea / Don`t know

2.6. Knowledge on the packaging of agricultural fresh produce

2.6.1. What is the correct way in which agricultural products sold in the same class must be packed?

1	Uniformly with regard to size, shape and appearance
2	One by one in packets
3	Combined with other varieties
4	In plastic bags
5	No Idea / Don`t know

2.6.2. Agricultural products sold should be packed in a material that will reduce what?

1	Transparency of the product
2	Contamination of the product and damage to products
3	Exposure of the product
4	The weight of the product
5	No Idea / Don`t know

2.7. Knowledge of compliance and penalty

2.7.1. Who should seize non-complying agricultural products sold in the market?

1	SAPS
2	The executive officer
3	Health Inspector
4	Metro police
5	No Idea / Don`t know

2.7.2 Any person (agriculture food producer) who disobey or refuse to conform with the requirements of the Act shall be found guilty of what?

1	An offence
2	Bribery
3	Sin
4	Negligence
5	No Idea

2.7.3. A person found guilty of an offence under the APS act shall be liable to what?

1	Suspension
2	Dispensation
3	Warning
4	A fine, or imprisonment for a period not exceeding two years
5	No Idea / Don`t know

2.7.4. To whom should a person who is affected by the decision of the executive officer direct an appeal?

1	Police
2	Court
3	Metro police
4	Director general of DAFF
5	No Idea / Don`t know

APPENDIX: 4 QUESTIONNAIRE COVERING LETTERS

Dear Respondent

I, **CYNTHIA CHAUKE**, have registered for the Master of Consumer Science Degree with the University of South Africa. I am conducting a research study **on Agricultural Product Standards Act, South Africa: Quality and Compliance of Agricultural freshproduce*insmall-scale retail outlets***. I am requesting your voluntary participation in this research study.

Your opinions and experiences are very important in this study, and you need to give an accurate picture, to enable me as the researcher to be able to analyze **Quality and Compliance of Agricultural fresh produce *insmall-scale retail outlets* of Tshwane metropolis** the current food safety practices in public hospitals in particular.

The main objective of the study is to:

1) Analyze the quality and grade of agricultural food products sold by farmers in selected retail outlets and markets in Tshwane metropolis
2) Evaluate the degree of compliance of agricultural fresh produce according to the Agricultural Product Standards regulations of South Africa.
3) Evaluate the level monitoring and enforcement on agricultural fresh produce
4) Evaluate the quantity of agricultural fresh produce that falls out of the Agricultural Product Standards regulation
5) Analyse retailers knowledge and awareness of agricultural fresh produce regarding the labeling, quality and grading standard of food products under the “Agricultural Product Standards Act, 1990 (Act 119 of 1990)”

The agricultural sector i.e. the Government (regulators) will benefit, because the research will point out the level of knowledge and awareness of retailers regarding the labeling, quality and grading standard of food products under the “Agricultural Product Standards Act, 1990 (Act 119 of 1990)”

Participation in this study is voluntary. You can withdraw from the study at any stage if you do not feel like continuing, even after you have consented to participate in the study. Please feel free to express your opinions and your experiences when completing the items put forward in the questionnaire. Your honest input is needed. Anonymity will be maintained and all the information given by you will be managed with strict confidentially.

Please do not write your name on the questionnaire, or anything that can identify yourself in any way. Nobody, except me as the researcher and a statistician, will see your questionnaire once it has been completed. It should take you approximately twenty to thirty (20-30) minutes to complete the enclosed questionnaire. For any enquiries, please find my contact numbers on the outer cover.

.

Thank you very much for your cooperation and assistance in this regard.

Researcher’s signature_____ Date_____

This page is to be retained by participant

APPENDIX: 5 LETTER OF CONSENT TO PARTICIPATE

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the questionnaire (Retailers knowledge and awareness of agricultural fresh produce regarding the labeling, quality and grading standard of food products under the “Agricultural Product Standards Act, 1990 (Act 119 of 1990)”

I have received a signed copy of the informed consent agreement.

Participant Name &Surname…… (Pleaseprint)

Participant Signature……Date……

Researcher’s Name & Surname…… (Please print)

Researcher’s signature……Date…….

APPENDIX 6: PERMISSION LETTER FROM DAFF

LETTER OF CONSENT TO CONDUCT RESEARCH FROM THE DEPARTMENT OF AGRICULTURE FORESTRY AND FISHERIES

agriculture, forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES
DDG: APHFS
DOCUMENT RECEIVED
2016 -10- 07
Signature:

Referred to: MDDG: APHFS
Date: 2016/10/24 Time: 14:10
Signature: JM Moreboli

General submission

Received at DG's registry on: 2016/10/13
Signature:
Time: 13:53

FILE NUMBER:

TO: Director-General

FROM: Deputy Director-General: Agricultural Production, Health and Food Safety

SUBJECT: **REQUEST FOR APPROVAL TO UNDERTAKE ACADEMIC RESEARCH WORK IN THE DEPARTMENT OF AGRICULTURE FORESTRY AND FISHERIES – DIRECTORATE INSPECTIONS SERVICES TO OBTAIN A MASTERS DEGREE IN CONSUMER SCIENCE**

CLASSIFICATION: CONFIDENTIAL

16/4/3651

1. PURPOSE

1.1 To obtain approval to undertake academic research in the Directorate Inspection Services (DIS), Department of Agriculture Forestry and Fisheries (DAFF).

2. BACKGROUND

2.1 Ms Chauke is a Chief Agricultural Food and Quarantine Technician in the DIS. She is responsible for heading the Auditing Unit which focuses on Systems audits in the Directorate and on Assignees, and is stationed in the Pretoria office.

2.2 In 2015 a departmental bursary to study a Masters degree in Consumer Science through the University of South Africa was awarded to her in order to further her studies.

2.3 To ensure that the DAFF and DIS fulfils its service delivery obligations, it is important that officials involved in providing an inspection and auditing service, continually improve their skills and knowledge. The Masters Degree in Consumer Science will assist in identifying areas in the quality sector that needs more attention in terms of inspection and regulation in DAFF.

2.4 The qualification, Masters Degree in Consumer Science, to which Ms Chauke enrols, consists of two modules, the research proposal and dissertation of which the research proposal must be submitted by the end of October 2016 in fulfilment of the qualification requirements.

2.5 The research topic is Quality and Compliance of Agricultural Food Products.

The study objectives are:-

1) To Assess the quality and grading of agricultural food products sold by farmers in selected retail outlets and markets in in Tshwane metropolis.
2) Analyse the degree of compliance of agricultural food products according to the Agricultural Product Standards Regulations of South Africa.
3) Analyse the level of monitoring and enforcement agricultural on food products.
4) Analyse the quantity of agricultural food products that falls out of the Agricultural Product Standards regulation.
5) Analyse retailers knowledge and awareness of agricultural food regarding the labelling quality and grading of food products under the "Agricultural Product Standard Act, 1990 (Act 119 of 1990)".

2.6 Data for the research will be collected by giving out a questionnaire to the relevant retail stores with regard to quality and compliance of agricultural products.

3 DELIBERATIONS

3.1 The research project is not aimed at discrediting DAFF but the research outcome can be used by DIS & DFSQA in enhancement of operational and service delivery to its clients

3.2 The official commits herself that her research work will not interfere or compromise her work. A copy of the research report findings will be forwarded to DAFF on completion of the study

3.3 A copy of research findings will be forwarded to DAFF on completion

4 ATTACHMENT/S

[a] Registration letter
[b] Bursary letter

5. LEGISLATIVE IMPLICATIONS

5.1 The research will culminate with regulation of some agricultural products under the Agricultural Product Standards Act 1990, (Act No.119 of 1990).

6. ORGANISATIONAL IMPLICATIONS

6.1 None

7. FINANCIAL IMPLICATIONS

None

8. COMMUNICATION IMPLICATIONS

None

9. RECOMMENDATION

It is recommended that approval be granted to Ms. N C Chauke to undertake academic research in the DIS to obtain a Masters degree in Consumer Science.

Recommendation/s supported YES ☐ NO ☐

.....

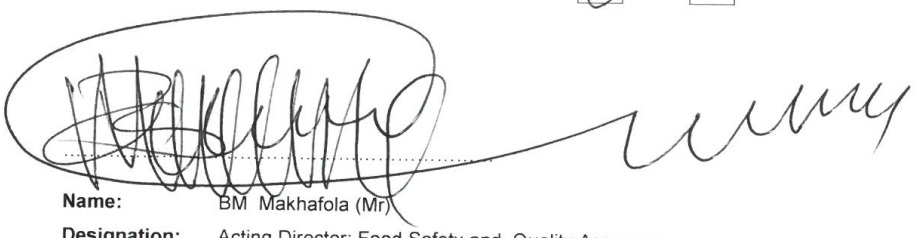
Name: GK Mediroe (Mr)

Designation: Acting Director: Inspection Services

Date: 2016 -09- 28

IT IS RECOMMENDED THAT APPROVAL BE GRANTED TO MS N.C. CHAUKE TO UNDERTAKE ACADEMIC RESEARCH IN THE DIS TO OBTAIN A MASTERS DEGREE IN CONSUMER SCIENCE

Recommendation/s supported YES ☑ NO ☐

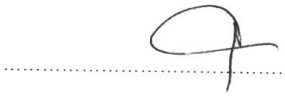


Name: BM Makhafola (Mr)

Designation: Acting Director: Food Safety and Quality Assurance

Date: 30/09/16

Recommendation/s supported YES ☑ NO ☐



Name: SM Melalane (Ms)

Designation: Acting Chief Director: Human Resources Management and Development

Date: 04.10.2016

IT IS RECOMMENDED THAT APPROVAL BE GRANTED TO MS N.C. CHAUKE TO UNDERTAKE ACADEMIC RESEARCH IN THE DIS TO OBTAIN A MASTERS DEGREE IN CONSUMER SCIENCE

Recommendation~~/s~~ supported YES [✓] NO [ ]

.....

Name: D Serage (Mr)
Designation: Chief Director: Inspection and Quarantine Services
Date: 2016/08/17

Recommendation/s supported YES [✓] NO [ ]

.....

Name: B.M. Modisane ~~RM Ramasodi (Mr)~~
Designation: Deputy Director-General: Agricultural Production, Health and Food Safety (Acting)
Date:

Approved/~~Not Approved~~ YES [✓] NO [ ]

.....

Name: MM Mlengana (Mr) | RAMASODI R.M.
Designation: Director General
Date: 2016-10-21

CLASSIFICATION: CONFIDENTIAL

SUBJECT: Request for approval to undertake academic research work in the DAFF DIS for Master's Degree

APPENDIX 7: PERMISSION LETTER FROM CITY OF TSHWANE

LETTER OF CONSENT TO CONDUCT RESEARCH FROM CITY OF TSHWANE

CITY OF TSHWANE

Environmental Management Department
Fresh Produce Market Division

Market Management Building | 450 President Burgers Street | Pretoria West |
PO Box 286 | Pretoria | 0001
Tel: 012 358 2398 | Fax: 012 358 2301
Email: patrickmp@tshwane.gov.za | www.tshwane.gov.za | www.facebook.com/CityOf Tshwane

My ref: 2/10
Your ref:
Contact person: Francois Knowles
Section/Unit: Commercial Services

Tel: (012) 358-2348
Fax: (0120 358-2301
Email: francoisk@tshwane.gov.za
Date: 16 January 2017

TSHWANE MARKET * ENVIRONMENTAL MANAGEMENT * 16 JAN 2017

To whom it may concern

MASTERS OF CONSUMER SIENCE: N'WAMHLABA CYNTHIA CHAUKE

This letter serves to confirm that Ms. Cynthia Chauke (Id 7802050365081) is planning to do a Master of Consumer Science at the University of South Africa with the title "An investigation of quality and compliance of agricultural food products in the Tshwane metropolis in terms of the Agricultural Products Standard Act".

She approached the Tshwane Market for research assistance (information) of which was granted to her on Monday 16 January 2017. As such she will receive any and all information that is required for her to complete her research. She will also be allowed to operate at the market to obtain knowledge, assess inspection processes and engage market role players to complete questionnaires in support of her study.

This letter will allow her access to the market and she was informed to have it in her procession on every occasion that she visits the premises.

She is wished well in her project.

If you require any additional information please contact Mr Francois Knowles at telephone 012 358-2348 or cell 083 415-1640.

Yours sincerely

PM Mphahlele:
Executive Director: Fresh Produce Market
On request, this document can be provided in another official language.

IT'S MY RESPONSIBILITY TO PAY MY MUNICIPAL ACCOUNT IN FULL ON TIME.

Kgoro ya Taolo ya Tikologo • Departement Omgewingsbestuur • Lefapha la Tsamaiso ya Tikologo
Ndzawulo ya Mafambiselo ya swa Mbango • UMnyango Wezokuphathwa Kwemvelo
Environmental Management Department

APPENDIX 8: ETHICS CLEARING LETTER

UNISA university of south africa

CAES RESEARCH ETHICS REVIEW COMMITTEE

National Health Research Ethics Council Registration no: REC-170616-051

Date: 04/04/2018

Ref #: **2017/CAES/024**
Name of applicant: **Ms NC Chauke**
Student #: **58523790**

Dear Ms Chauke,

Decision: Ethics Approval Renewal after First Review for period 01/03/2018 to 28/02/2019

Proposal: An investigation of quality and compliance of agricultural food products in the Tshwane metropolis in terms of the Agricultural Products Standards Act

Supervisor: Dr F Tabit

Qualification: Postgraduate degree

Thank you for the submission of your progress report to the CAES Research Ethics Review Committee for the above mentioned research. Approval is granted for the continuation of the project.

Please note that the approval is valid for a one year period only. After one year the researcher is required to submit a progress report, upon which the ethics clearance may be renewed for another year.

Due date for progress report: 28 February 2019

The resubmitted application was reviewed in compliance with the Unisa Policy on Research Ethics by the CAES Research Ethics Review Committee on 15 February 2017.

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

The proposed research may now commence with the proviso that:

1) *The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
2) *Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the CAES Research Ethics Review Committee. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*
3) *The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.*

Note:

The reference number [top right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the CAES RERC.

Kind regards,

Signature

CAES RERC Chair: Prof EL Kempen

Signature

CAES Executive Dean: Prof MJ Linington

APPENDIX 9: DESSERTATION EDITOR'S CERTIFICATE

P.O.BOX 13032
The Tramshed
0126
25 April 2020

To whom it may concern

This is to confirm that Dr. Keaobaka Seshoka, a member of South African Translators' Institute (SATI), with the membership number 1003363 edited Ms. N'wamhlaba Cynthia Chauke's thesis titled 'AN INVESTIGATION OF QUALITY AND COMPLIANCE OF AGRICULTURAL FRESH PRODUCE SOLD IN THE TSHWANE METROPOLIS WITH THE AGRICULTURAL PRODUCTS STANDARDS ACT OF SOUTH AFRICA'.The following issues were corrected: grammar, spelling, punctuation, sentence structure, phrasing, and referencing.

Regards

Dr K.O.P Seshoka
0782312946
keamab@gmail.com

Letter to confirm editing -CHAUKE NC.pdf

APPENDIX 10 : DESSERTATION TURNITIN REPORT

Turnitin Originality Report

Processed on: 25-Apr-2020 20:00 SAST
ID: 1307558495
Word Count: 30429
Submitted: 1

MCS Dissertation- Examination corrections By Nwamhlaba Cynthia CHAUKE

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